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CHONDRECTOMY OR OPERATIVE TREATMENT OF BRONCHIAL ASTHMA *

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CHICAGO

The term "rigid dilatation" aptly defines a condition of the thorax wall often seen in old cases of emphysema and bronchial asthma. The bony, cartilaginous and muscular framework of this wall in young and normal subjects is united into an elastic lattice or basketwork, semirigid yet yielding, called very picturesquely by the Germans the basket of the chest (*Brustkorb*).

Functionally the thorax may be contrasted with the entirely rigid pelvis on the one hand and the nonrigid abdomen on the other, being intermediate in character—more flexible than the former and less flexible than the latter. Unlike the abdominal wall, which has powerful compression but only passive dilating power, the thorax wall has active expansion, creating negative pressure or suction and relatively little compressive force—chiefly passive.

In bronchial asthma and vesicular emphysema the chest becomes dilated or barrel-shaped and loses its power to contract when relaxed. The cartilages connecting the ribs to the sternum may take on a new hardness, due to partial ossification or calcification. They become asbestos-like and relatively firm and brittle in texture in some old patients, so that passive or elastic contraction of the chest is lost. The dilatation of the alveoli and lung tissue is so great that the chest wall remains fully expanded and the thorax loses nearly all power of lateral contraction. This produces or exaggerates the well-known symptom of expiratory dyspnea. Respiration must be carried on almost wholly by the diaphragm, which of itself has little control except over the inspiratory act. This is helped in part by the neck muscles which can fix and raise the clavicles and first rib, thereby lifting the whole thorax.

LOSS OF EXPANSION

In numerous cases examined in our clinic expansion was less than 1 cm., and in several it was nil, or too small to measure with the tape.

We owe what we know of the mechanical or surgical treatment of emphysema and apical tuberculosis to certain studies of a young Breslau physician over fifty years ago—1858. Freund, later a celebrated gynecologist at Strassburg developed this subject in eight papers from 1858 to 1910. These suggestions, though published, lay almost unnoticed until after Listerism and the perfection of thoracic surgery, when he himself began to put his theories into practice and had the unusual satisfaction of seeing his technic adopted by Von den Velden, Garré, Hansemann and numerous other clinicians and freely credited as the Freund operation.

The term "Freund's operation" defines two distinct procedures, namely, the operation to relieve the barrel-shaped chest or rigid dilatation of old asthma and emphysema, and the operation to expand the upper outlet of the chest in certain types of apex tuberculosis. Both these operations, I am certain, have proved beneficial and even life-saving in my experience, but the latter—the one for emphysema—is of more practical importance so far in my work because more frequent.

MECHANICS AND PATHOLOGIC ANATOMY

Von den Velden, following Freund's classical work, shows the importance of defining clinically the various forms of rigid thorax, as the senile, or presenile, which is not in the form of dilatation or due to cartilage changes, the paralytic form and that due to kyphosis or rachitis, etc. The anatomic picture of rigid dilatation of asthma is peculiar and this form only is suitable for surgical treatment.

The essential feature is the calcification of the rib cartilages. They become bone-like and rigid, so that the chest wall cannot contract. Certain observers, as von Hansemann, take the rather extreme position that this bony condition rather than the asthma is the primary cause of the disease, the lung changes, such as thinning and atrophy of the alveolar walls, being secondary.

It is not necessary to believe this to admit the value of Freund's operation of chondrectomy. Surgical relief is possible in a certain type of these cases and ought promptly to be employed before dyspnea, cyanosis and too grave secondary changes have made all measures futile. I have found that these patients, usually old people with confirmed bronchial asthma and arteriosclerosis, nevertheless stand the interference remarkably well and are rapidly, almost instantly relieved, so as to be conscious of a betterment in their breathing and to show it in diminished cyanosis.

The method employed is a thoracoplasty which removes the costosternal joint and costal cartilages and substitutes a fibrous or hinge-like union of ribs to sternum, restoring at once full expansion to the thorax wall. Thoracic surgery has lost its terror, which was due largely to the dread that hangs about the unknown, and we no longer hesitate to open a pleural cavity without any cabinet or differential pressure. This operation need not endanger the pleura

* Read before the Section on Surgery, General and Abdominal, at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

or pericardium, although both are exposed, and does not, in my experience, cause any great amount of shock or present any serious technical difficulties.

REASONS FOR CHONDRECTOMY

It is the aim of the operator to detach from their sternal connections four of the ribs,—the second, third, fourth and fifth, and to make them permanently mobile by cutting out their cartilages. These four ribs are the only ones directly uniting the sternum, except the first, which will be referred to later. The diastasis of ribs from sternum is to be permanent. The intervening 3 or 4 cm. of non-rigid chest wall make a hinge joint to take the place of the excised hardened cartilages. Immediately after the operation there is more than a hinge action, a bellows or back-and-forth movement. The rib ends move longitudinally, alternately widening and narrowing the space between their cut ends and the sternum. This is lost later as the space narrows in healing. It is even difficult to maintain the hinge action because the cartilages tend to grow again unless all traces of perichondrium are extirpated. Special means of preventing this are a part of the plan of operation.

Fig. 1.—Normal chest wall and form of pleural cavity (above) contrasted with rigidly dilated wall and cavity (below) as sketched by Freund, Garré and others.

Fig. 2.—Barrel-shaped cast of chest and normal chest (above); roentgenogram of cartilages before and after resection (below) after Sauerbruch.

TECHNIC OF CHONDRECTOMY

The operation is relatively simple to any one familiar with rib-resection in general. The pericardium is not exposed to injury in operating on the right side. Unilateral chondrectomy is usually sufficient to give relief. Bilateral operations are always done in two stages. A longitudinal or parasternal incision is more conservative in my experience. The operation can also be done equally well through four short transverse cuts parallel to the four ribs removed.

The second, third, fourth and fifth costal cartilages are divided from the sternum and at or near the attachment to their rib ends. A little of the bony rib is best removed with each cartilage if the latter is short.

Unlike the Erstländer operation or ordinary rib-resection for carious rib or in empyema cases, in this operation the periosteum or perichondrium must be destroyed with the rib. This makes the dissection less easy, but not very tedious. In case of accidental puncture of the pleura no harm results. On its anterior surface, of course, this membrane comes easily with the rib; posteriorly, care must be taken by blunt dissection to make a line of cleavage between perichondrium and pleura, leaving the former intact on the cartilage. A spatula or Kocher director does this safely. Fragments of perichondrium seem prone to be left behind so that later more or less rigid cartilage reforms and makes the chest again inelastic. To prevent this I like to obliterate the groove left by each cartilage with a circular stitch of catgut. At least four other methods have been tested by followers of Freund in efforts to prevent this recurrence:

1. Hoffman sutures carefully the ends of the perichondrial tube over the stump of the cut-off rib, as is done in ordinary amputations through bone.

2. Axhausen applies the actual cautery to the remnants of these membranes in the grooves. This seems to me a grave danger to the adjacent pleura and lung and an obstacle to primary healing.

3. Bircher applies 95 per cent. phenol (carbolic acid) with the same intent. I have not tested this method.

4. Seidel uses slips or ribbons of adjacent muscles crossed like a letter X to fill the cavity between the rib end and the sternum. This I like very well, but find the lateral approximations of the groove just as effective.

A surprising feature of this work is the instantaneous relief obtained, not only after the operation but before its completion when the first cut through the cartilage is made. Instantly the chest wall expands and contracts as it has not done for years and the gap in the rib opens and shuts with an excursion of 1 or 2 cm. As each section is made the expansion is increased, until when all four are divided they move apart and come together freely. In fact, the first relief is the best, and subsequent healing, as noted above, tends to impair the elasticity gained. In spite of the soreness of the incision the patient makes deep inspiratory and expiratory movements and his cyanosis disappears on the table. He can lie down as he has not done for years — resting his overstrained diaphragm and neck muscles which have been vainly trying to compensate for his reduced contraction.

WHEN CHONDRECTOMY IS CURATIVE

The proper selection of cases means success or failure of this as most other surgical operations. Not

all asthmatics—not even all cases of emphysema—are to be so treated.

Only cases of rigid and dilated chest are helped by it. The diagnosis rests not alone on cough and dyspnea, but we have certain objective conditions of the thorax wall. It becomes cylindrical. The ribs assume

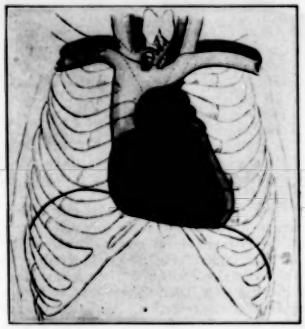

Fig. 3.—Relations (normal) of pericardium, pleura, rib and great vessels showing greater safety of chondrectomy on right side.

a more horizontal position than normal and do not sink in expiration. The sternum is pushed forward and the cartilages are bowed and rigid. This means that the lower thoracic outlet is enlarged. The epigastric angle is, therefore, widened from 100 to 140 degrees. Inspiration does not increase the chest cir-

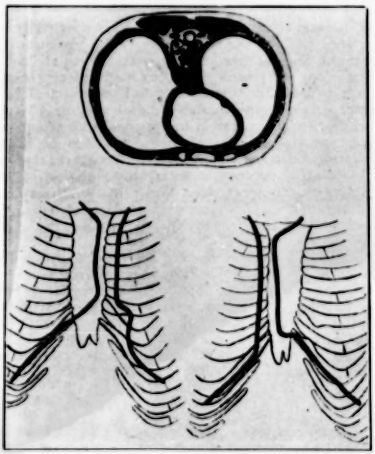

Fig. 4.—Reflections of pleura in inspiration and expiration, showing extreme excursion.

cumference. Expiration is slow and stridulous. There is cyanosis and capillary venous stasis. The diaphragm is flattened and the right heart area is widened. Vital capacity is reduced from 3,000 or 4,000 c.c. (normal) to 2,500 or less; in extreme cases as low as 800 or even 400 c.c. (Franzenheim's case).

INDICATIONS AND CONTRA-INDICATIONS

To sum up our knowledge of this new therapeutic measure, the indication for its adoption is the presence of the emphysematous chest rigidly held in the "inspiratory position," that is, dilated. The operation restores the lost power to take the "expiratory position," that of contraction.

As contra-indications may be mentioned severe cardiac and vascular disease, fetid bronchitis or bronchiectasis. Lambert warns against Freund's operation in cases due to costo-vertebral ankylosis, in which it can do only harm. Also Mohr warns us to exclude two other types of rigid thorax: (1) cases of tonic rigidity due to abnormal tension of the inspiratory muscles in nervous and cardiac asthma; (2) cases of rigidity following paralytic chest wall.

Fig. 5.—Relations of internal mammary and intercostal vessels. Sections of asbestos-like cartilages. After Garrè.

WHAT MAY BE EXPECTED OF THE OPERATION

The true type for operation having been found—the barrel-shaped, rigid chest, with little or no expansion measured by the tape—much hope of relief is offered by chondrectomy. The operative mortality is almost nil. It is an operation very well suited to local anesthesia. With nerve-blocking of the intercostals it is absolutely painless. Relief begins when the first cartilage is cut through. It is an impressive sight to see the divided ends move freely in the wound where there had been no movement for years. Giving the stretched but still elastic lung tissue a chance to contract, we see that it proves its own elasticity after long overstrain. It is proper to remove the bony rib as well as the cartilage, if it seems to help the contraction. In one case I excised 6 cm. of the third and fourth ribs.

The diaphragm also acts more fully after the section, but in bad old cases we cannot always expect a perfect restoration of its cupola or dome, it having been flattened out by long stretching.

Vital capacity in good cases will be increased 50 or 100 per cent. Franzenheim reports one extraordinary

case in which he gained from 400 up to 2,000 c.c. by operation. The dyspnea improves, as also the bronchitis. Even deep lung changes, atrophy and dilated vesicles may be favorably influenced so that health and strength are restored in a marked degree.

THE QUESTION OF THE FIRST RIB

Tuffier included the first rib in performing chondrectomy for asthma. This is found by Von den Velden, Axhausen and others, including myself, to be unnecessary. The first rib has little influence on inspiratory or expiratory position.

Freund's operation, however, included the removal of the first rib cartilage for cases of early apical tuberculosis, especially in childhood.

Certain pathologic and anatomic facts are coming to be recognized which support the claims of chondrectomy of the first rib as a curative measure in early tuberculosis. My own experience and even that of the whole profession is too limited to give this opera-

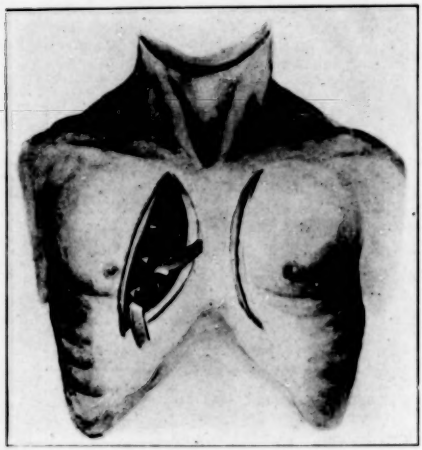

Fig. 6.—Details of chrondrectomy. The slips of muscle after division are best utilized by crossing their ends over the cut ribs to make fibrous hinge joints and prevent regeneration of cartilages.

tion a firm position in surgery. The following facts as summarized by Garré, Tuffier and others are somewhat convincing in pointing the way to chondrectomy of the first rib as a measure of great promise.

1. Want of development or ossification of the first rib cartilage causes loss of mobility of the "upper chest aperture."

2. The consequent constriction of the bronchi above causes catarrh and favors tuberculosis in the bronchial mucosa.

3. A furrow often appears where the first rib crosses the apex. This may indicate injurious pressure.

4. Asymmetrical stenosis causes curvature of the dorsal and cervical vertebrae.

5. Spontaneous cure is sometimes seen in apical tuberculosis after natural pseudarthrosis of the first rib has occurred.

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ABSTRACT OF DISCUSSION

DR. SAMUEL ROBINSON, Boston: It is rather interesting to group Freund's operation with that of Brauer, namely, cardiolysis, or the resection of ribs, to relieve back pressure on the veins entering the heart from below, in cases of adhesive mediastinal pericarditis. The technic of that operation is not unlike this of Freund's in chondrectomy, and the relief is correspondingly great. The operation is really a conversion of an ankylosis into pseudarthrosis. We are not dealing with a true arthrosis, but operative success consists in producing a pseudarthrosis by the formation of a real joint instead of a resected cartilage. This can only be done, as in all work on ankylosed joints, in such a way that cartilage or bone from the end of the rib or from the sternum cannot recur, and if possible a false joint is produced. The permanency of the relief of the symptoms depends on the extent of this pseudarthrosis. If that is supplied by sewing the posterior perichondrium over the ribs or introducing fascia, that permanency is procured. I disagree with Dr. Andrews on one point only—that the cartilage resection is a simple procedure, and that any one accustomed to rib resection in general could do it with perfect ease. After undertaking a series of rib resections in animals with normal pleura, and after performing Brauer's operation of cardiolysis, I have great respect for the complications incident to rib resection. When the posterior perichondrium or the periosteum is removed, as it is in the dissection from the pleura, it taxes one's technical skill. I watched one surgeon do the cardiolysis operation for the first time, and, naturally skilful in his technic, he removed the cartilages and three ribs for several centimeters without puncturing the pleura; the next surgeon who tried it did puncture the pleura. I would caution against Dr. Andrews' remark, that if the pleura is punctured, it does not matter. Puncturing the pleura in a case of this sort does not mean catastrophe, but if we resect the rib with this view, we will puncture the pleura much oftener than if we realize that it is best not to do so. In following convalescence in a good many thoracic cases after operation, I am convinced of the importance and the seriousness, on many occasions, of the presence of postoperative pneumothorax. When air has been admitted into the pleural cavity, in a great many cases it amounts to nothing. Convalescence is complicated by the presence of air in the chest. We do not know why. The changes which may occur in the respiratory function are of significance. In a series of forty-four cases of Freund's chondrectomy there is evidence in the fatal cases that death was hastened by puncture of the pleura.

DR. CHARLES GOODMAN, New York: In 1907 Bramann and Seidel reported the first operation recommended by W. A. Freund for pulmonary emphysema with rigidity of the chest. During that same year I, with assistance of Dr. Wachsmann, at the Montefiore Home, resected the third, fourth and fifth costal cartilages in a case of chronic emphysema with asthma and rigidity of the chest. The immediate results were certainly striking. The patient, who had not been able to sleep for many weeks, was able, following the operation, to lie on his bed without a pillow and get a quiet night's rest. Shortly after this we operated at the Home on three other patients but had changed our technic. In our first operation we had followed the technic of Bramann and Seidel, and simply removed the costal cartilage with the overlying perichondrium. We did not feel at that time the necessity of going any further. After six weeks, rigidity of the ribs returned. In a secondary operation in this case and in the treatment of three others our technic was the following: exposing the costal cartilages on one or both sides, peeling up the anterior layer of perichondrium, then resecting 1 or 2 cm. of the offending cartilage and peeling the posterior layer of perichondrium from the pleura. One flap of the perichondrium was then reflected over one end of the resected rib and the other layer was reflected and fastened over the other end, so that we had two contiguous layers of perichondrium forming an artificial joint. It has been gratifying to be able to note lasting results from this method. Our first four cases were

presented before the New York Academy of Medicine the following year and reported in the *Medical Record* in April, 1908. In two of my more recent cases, one patient having been operated on before the American Clinical Congress, the expansion of the chest, the asthma and the general condition of the patients were decidedly improved. About two years after our report Hoffman of Meran, mentioned by Dr. Andrews, reported two cases operated on successfully by him. He had used the technic as described in the *Medical Record* but had not mentioned the American author of the operation. Wilms of Heidelberg had suggested instead of resection of the costal cartilages, resection of the ribs posteriorly near the angle. I am not entirely in accord with Wilms' suggestion because I have found the cartilages when degenerated and thickened to be readily accessible and easily removed. The operation is comparatively simple. The pleura is usually thickened underneath the diseased cartilage and there is little danger from perforating it.

DR. GEORGE N. JACK, Buffalo, N. Y.: I would like a more definite explanation as to the indications for this operation. I can see no excuse for a thoracic-wall operation in uncomplicated asthma. For the last fourteen years I have maintained that asthma is a functional or biochemical metabolic disturbance resulting in an unstable hypersusceptible blood that is sensitized to numerous food and weather conditions, and that the dyspnea of asthma is due to a plugging of the air-tubes through an effort of nature to eliminate the waste products of a disintegrated blood. Out of 618 cases of uncomplicated asthma treated according to these principles none thus treated has had asthma bad enough to require this operation, and in 75 per cent. of these cases the food and weather conditions to which they are sensitized have been sufficiently determined to educate them how to live without asthma. The dyspnea of chronic fibrinous bronchitis or chronic fibroid consumption is often mistaken for asthma. For the dyspnea of either of these two conditions or for similar dyspneas, any operation that will give relief, if only temporary, is justifiable no matter how radical the operation may be.

DR. E. WYLLYS ANDREWS, Chicago: Mechanical troubles require mechanical relief and this is not an operation for an old case of emphysema or a bronchial asthma itself, but for rigid and dilated chest. The result is almost instantaneous, but as time goes on the improvement is less marked. It remains less flexible than we would like to keep it. The probabilities are that only such cases as have been worked out carefully by our friends, the internists, will ever be suitable for the mechanical procedure.

Society and Sex Problems.—The intricate problem of the regulation of sex relationship in modern society is showing signs of a rapid progress through the normal evolution of all social problems out of the sphere of ethics into the sphere of sociology. The primitive state in which men at first approach all such problems is the ethical and emotional. They are filled with a repugnance, say, to prostitution, and they loudly demand measures for its regulation or suppression without realizing the underlying conditions. The failure of these measures, where obtained, after a while leads up to the second stage. The condition of emotional animosity gives way to the spirit of scientific inquiry; the primitive axiom, "Something must be done," is succeeded by a desire for a knowledge of the actual facts and the collection of information from all sources that are open: the problem, in short, passes from the sphere of ethics to the sphere of sociology; from the sphere of emotional but ignorant action to the sphere of intellectual inquiry. It is only later that the social problem finally passes back once more to the sphere of ethics; but the action taken is no longer blind and emotional, it is guided by the results obtained from the impassive sociologic investigations. Whereas the problem of marriage is still restricted within the first or ethical stage, the problem of prostitution has now fairly emerged into the colder air of sociology.—*Lancet*, London, April 25, 1914.

THE SURGERY OF THE KNEE-JOINT*

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LONDON, ENGLAND

The abdominal surgeons planned their incisions to give exposure and gain access to the part desired, to minimize the hemorrhage and the interference with nerves, blood-vessels and lymphatics, and to cause the least subsequent inconvenience to the patient. Those are the principles on which surgeons have based their operations, and in order to attain similar success it is needful to plan our incision into the knee so that it gives the operator the maximum of exposure, access to (the most difficult part) the back of the joint, the minimum of hemorrhage, the minimum of injury to nerves, vessels, muscles, tendons, etc.

Do the operations on the knee, as usually performed, agree with these propositions? First, let us consider the horseshoe-shaped incision reaching below the patella and dividing the ligamentum patellae. The flap is turned upward, the exposure and access (with flexed knee) are excellent; there is no attempt to close the synovial cavity; the sutured tendons take some

Fig. 1.—Skin incision for median arthrotomy of knee.

Fig. 2.—The same incision marked to show the treatment of the rectus femoris, the patella and the ligamentum patellae in median arthrotomy of knee.

Fig. 3. — Exposure of joint through median arthrotomy.

time to unite and during that period get matted to other structures. Consequently, the knee which was so damaged as to require operation is usually further damaged by the operation. When it is remembered that the great majority of operations on the knee are operations of choice rather than of necessity, the operation to be offered to the patient must not damage the joint. To overcome this difficulty surgeons have divided the patella transversely or cut the muscles above the patella, turning down the flap containing that bone. These methods require so much suturing and satisfactory healing that no surgeon who performs them has the right to offer them as an operation of choice to any patient desirous only of an operation to improve the usefulness of his knee in life. There is one modification of this horseshoe method of arthrotomy of knee which deserves more consideration. In it, the skin incision is made, to

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* Because of lack of space this article is abbreviated in THE JOURNAL. The complete article appears in the Transactions of the Section and in the author's reprints.

cross the front of the knee below the tubercle of the tibia. That bony prominence with the ligamentum patellae attached to it, is sawn off obliquely as in Sabanijew's amputation. The flap with the patella is then turned up. At the conclusion of the operation the tubercle of the patella is fastened to the tibia again. As with all these anterior horseshoe methods of arthrotomy, excellent exposure and access to the joint is obtained at the price paid for much division of soft parts at right angles to their line of action with consequent lengthening of the convalescence and increased postoperative disability. The position may be summed up by saying that transverse incisions in front of the joint are second-best, giving marked disability afterward from the necessary division of the soft parts.

Let us now consider longitudinal incisions, such as that of Professor Kocher, along the outer side of the patella. These are three in number: along the outer side of the patella, along the inner side of the patella and through a longitudinally split patella. Both of the lateral incisions are excellent, but, in my opinion, from their asymetry they are not so efficient as the median incision and do not give so good a functional result as that into the joint through the longitudinally split patella. In it the rectus muscle, patella, and ligamentum patellae are split in the axis of the limb, no fiber being divided, thus having advantage over all other methods of opening the knee. It gives excellent access to all parts of the joint, even the posterior parts can be explored by sight, when the knee is flexed; and it does away with the need of that "septiciferous" process, putting a finger into the joint. To use fingers at the operating-table is usually as bad manners as to use them at the dinner-table—a very

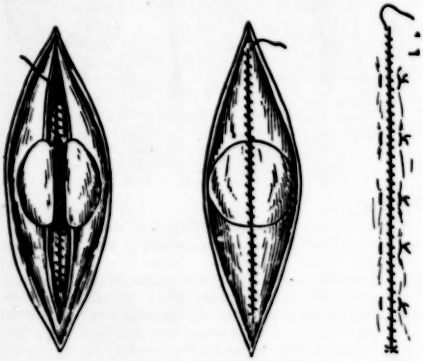

Fig. 4.—A method of closure of the wound in median arthrotomy. *A*, the synovial membrane closed by two (one suprapatellar and one infrapatellar) continuous catgut suture. *B*, closure of the rectus, patella and ligamentum patellae with a continuous catgut suture. *C*, skin wound closed with a continuous catgut suture and some tension stitches.

important point, for unless certain of his aseptic technic no surgeon has the right to recommend a patient to allow him to open his knee-joint. This operation was advocated recently in the first number of the *British Journal of Surgery* by Mr. Robert Jones of Liverpool for access to some results of injuries to the spine of the tibia. He has now extended its application with satisfaction and success.

The conclusion of the operation is simple and quick. The synovial membrane above the patella is closed by a fine continuous catgut suture. This is important as it prevents blood from the loose areolar tissue above the subcrureus pouch from entering the joint. The split in the rectus muscle and ligamentum patellae is closed by another continuous catgut suture, which also holds the two halves of the longitudinally split patella together and holds it so efficiently that a roentgenogram taken a day or two after the operation shows "no injury to the patella obvious." Sides of the wound are approximated by three or four rectangular (mattress) sutures of catgut, and the edges coapted by a continuous suture of fine catgut with the stitches close to the skin and to one another. These stitches need never be removed. No splint is necessary but its use for twenty-four hours is beneficial. After that a nervous patient can have the limb bandaged in wood-wool. The wood-wool can be removed from time to time and the patient allowed to move the leg. I never hurry convalescence, the patient remaining in bed about three weeks. Massage and electrical stimulation of the muscles can be begun a few days after operation. Passive movements are hardly ever necessary. Active movements by the patient are much better, and even a nervous patient may be encouraged to make them.

Fig. 5.—The crucial ligaments in a flexed knee, anterior view.

A study of the physical geography of the knee will give some clues to the parts played by the various component structures in the physiology and pathology of the joint. At the knee a convex bone (the femur) is held to a flat bone (the tibia) by a capsule of fibrous tissue, thickened at the lines of stress at the sides into ligaments, the external and internal lateral ligaments. But if this was all, the length of the capsular ligaments would allow the tibia to move in all directions on the femur, as well as backward and forward. Such a joint would be horribly unstable and unsafe. To remedy this there are placed inside the knee-joint two sets of structures, the crucial ligaments and the semilunar cartilages. These are united in part at their tibial attachments, both in front and behind. Together they give strength and firmness to the joint, limiting the gliding of the femur on the tibia. In the normal movements of a joint they will sustain no harm, but should the movements become exaggerated, as in a wrench or sprain, they will be damaged. Naturally also the structure which bears most strain in ordinary life will be most liable to sustain damage in extraordinary movements. It will also be the strongest and therefore the best able to withstand a shock. The crucial ligaments are the strongest ligaments in the knee-joint and bear by far the greater part of the strain. In an accident, as in ordinary life, the severest strain will fall on them. Hence it is to be anticipated that injuries to them will be both frequent and important. We know little about

such injuries, probably because they would not be fatal, and the deep situation of the ligaments renders their inspection difficult. There are clinical signs, however, which would indicate their lesion.

1. Movement of the tibia on the femur.
2. Any dropping back of the tibia of the femur.
3. Any rotation of the tibia on the femur, almost always external.

In all these three signs the leg must be carefully compared with that of the other side, which should not previously have sustained an injury. In an old knee injury none of the above-mentioned signs need be found so that a most valuable symptom is the patient complaining of lack of stability in the joint, the knee giving way, the patient feeling afraid to trust to it. Such knees are well known clinically as "slipping knees," and are, I believe, produced by the sliding of the femur on the tibia. If a group of patients in whom the result of the operation for the removal of the semilunar cartilage is unsatisfactory are examined, a very large number will be found to have slipping knees. Normally a little rotation of the tibia on the femur is permitted. But this should be the same on both sides and can be easily seen if the patient sits

Fig. 6.—The crucial ligaments in a sagittal section of the knee; *A*, flexed, *B*, extended. This is taken from a standard text-book of anatomy and is designed to show the anterior crucial ligament tight in extension (*B*) and the posterior crucial ligament tight in flexion (*A*). This is wrong; both are taut in full flexion and full extension and both are slack in semiflexion.

down with legs extended and heels on the ground. Look to the position of the feet. This rotation is not limited by the crucial ligaments only, but also by the semilunar cartilages. Two general remarks may be made.

1. The *crucial ligaments* bear considerable strain in all movements of the knee and seem most prone to injury in exaggerations of flexion and extension of the knee, that is, by movements in a vertical plane, the patient standing. With lateral movements an injury of the lateral ligament, almost invariably the internal lateral, must sustain damage, partial rupture, before the crucials are dangerously stretched.[1] Rotation movements of flexed knees are more likely to produce injuries to the semilunar cartilage, which injuries are made permanent or increased by subsequent movements of extension. For instance, by it the displaced cartilage may be fractured.

1. Corner, Edred M.: The Rôle of the Crucial Ligaments in Hemarthrus and Injuries to the Knee, Lancet, London, May 9, 1914, p. 1317.

2. The *semilunar cartilages* bear most strain and are most likely to be injured with movements of rotation with semiflexed joints.

Other ligaments of the knee are not likely to be injured with the exception of the internal lateral ligament, whose injury I believe to be a preface to, when partial, that of the crucial ligaments; and when complete, a sequel to the complete rupture of the crucial ligaments.

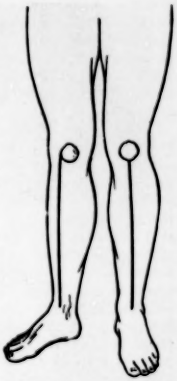

Fig. 7. — Semidiagrammatic sketch to illustrate the skin-line with and without partial rupture or stretching of the crucial ligaments produced by the external rotation of the tibia of the femur, right leg.

Before we leave this subject it will be well to recall to mind that when the crucial ligaments bear a strain their bony attachments bear that strain also. Partial rupture of these ligaments is often overlooked. I must confess that I have encountered one instance which I believe to be due to the bony union of an overlooked and partially detached spine of the tibia. So far as our knowledge goes at present, the anterior attachment of the anterior crucial ligament is most often detached alone. The other three attachments of these ligaments often seem to escape. Such ideas must be received with great caution, however, as the tibial attachment of the anterior crucial ligament is the one which is more easily seen than the others and naturally we come to knowledge of it first. It is said that with rupture of the anterior crucial ligament there is pain and disability on extension of the limb; while with a lesion of the posterior crucial ligament there is pain and disability on flexion of the knee. I do not think that it is possible, clinically, to dissociate tension on these two structures. With injury to these liga-

Fig. 8.—Showing the strain placed on the crucial ligaments in movements of the knee-joint.

ments there is pain both on full flexion as well as on full extension of the joint. In fact, there is pain on all extremes of movements of the knee, flexion extension or rotation, because the crucial ligaments are tightened by all these movements; hence their liability to injury.

The strain on the crucial ligaments is not all. The synovial membrane is loosely attached round the front of the knee, where it must move with movements of

the joint, but is closely attached to it as it covers the crucial ligaments and the back of the joint where there is no need for it to move. Stresses and strains in that situation easily tear it even if there is nothing but a slight and temporary stretching of the crucial ligaments. The roentgenograms of the artificial (wire) anterior crucial ligament show that the loops separate with flexion and extension of the joint,[4] thus giving

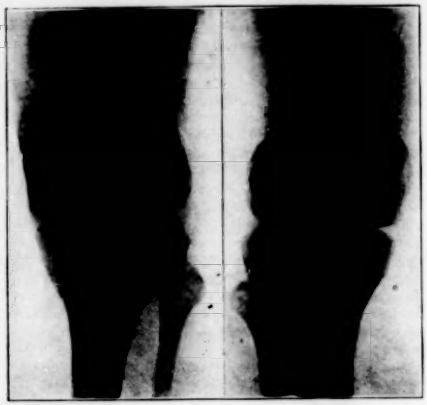

Fig. 9.—The roentgenogram of both knees is shown so that the external tubercles of the tibia may be compared as they exist in each knee. That on the left side is much sharper and more slender; possibly it was broken and partly detached by the accident, uniting with extension of ossification into the anterior crucial ligament.

some idea of the amount of stretching which the crucial ligaments are constantly undergoing. Bleeding thus caused will lead to the joint becoming filled with blood and, later, synovia, a condition of hemarthrus. Formerly it was never quite understood why blows on the knee should give rise to synovitis, the joint becoming full of bloody fluid. Now it is intelligible. The force of the blow is transmitted, say, from the patella to the femur, which it attempts to drive backward, but is prevented from doing so, in part, by the crucial ligaments. These ligaments, particularly the anterior one, are stretched, and the tightly bound-down synovial membrane over them is torn. Hence hemarthrus and traumatic synovitis. The blood comes from some small intra-articular lesion caused by some slight displacement of the femur on the tibia, or *vice versa;* and the effused blood acts as an irritant to the synovial membrane, inducing inflammation and hypersecretion. From this we may learn that the sooner the effusion of blood ceases and the effused blood is removed from the joint, the better for the patient. Mere tapping cannot do this. The joint should be opened and washed clear. The tear in the synovial membrane, or otherwise, can be sutured or not according to the case. I would commend to your notice the possibility of taking this unusual step in what seem to be "bad" cases, and for this reason. The synovial tear, or tears, will heal by a layer of fibrin being deposited on it, like healing under a blod clot or scab. If this fibrin becomes displaced by a movement of the joint another layer of fibrin will form. The displaced fibrin may be removed by the leukocytes, or it may be shed into the joint. If it does the latter, it may form the nucleus of a loose body in the joint. I would suggest that in many cases the signs of the inflammatory origin of a "joint-mouse" are secondary to the repair of some trauma.

On looking through the records of sixty-one cases in which loose bodies were removed from the knee-joint and recorded in the St. Thomas' Hospital Surgical Reports, one cannot avoid being struck by six things:

1. How uncommonly the origin of these loose bodies is ascertained.
2. How often they are multiple.
3. How often they are called recurrent.
4. How often they consist of fibrin.
5. How often they are temporarily lost in the joint.
6. Apparently how long they can be present without causing any urgent symptoms.

The detached fibrinous plaque grows like a crystal in a saturated solution of its own salt. It becomes triturated and rolled by the movements of the joint and it would appear that at times it undergoes bony or cartilaginous changes. I have found bodies, previously felt loose in a joint, attached to the synovial membrane. For a loose body to become so attached is a distinct reversal of the generally accepted idea that nodules in the synovial membrane may become detached and form loose bodies.

I would suggest that the majority of loose bodies in the knee-joint have an origin in a tear in the synovial membrane of the posterior part of the knee-joint, particularly in the thin and tightly bound-down synovial membrane over the crucial ligaments. Such an idea suggests that a free exploration of the knee-joint be done more often in cases of hemarthrus. This is

Fig. 10.—Anterior-posterior roentgenogram of a knee in a case of ruptured anterior crucial ligament in which a new anterior crucial ligament was made with two loops of silver wire. The patient was shown to the Clinical Section of the Royal Society of Medicine, London.

Fig. 11.—Lateral view of the knee shown in Figure 10.

alone justifiable with modern technic. The knee-joint is not more prone to grow foreign bodies than other living tissues. Yet such bodies are rare in other joints! Can it be so because they have no such arrangements as there are about the crucial ligaments of the knee?

4. Corner, Edred M., and de Mowbray, R. M.: Fractured Spine of the Tibia, Proc. Roy. Soc. Med., Clin. Sec., April, 1914, p. 122.

To the question when to open a joint after an injury the answer is either at once or as soon as the hemorrhage has ceased. To do all this satisfactorily I would urge the use of the method of opening the joint by splitting the patella longitudinally. The method reveals a further series of problems, commencing with the question of tapping the joint.

When the patella is split longitudinally, it is seen that the knee-joint consists of three cavities, two simple and one complex. The first cavity, the suprapatellar, lies on the femur, above the patella, whose contact with the femur very largely divides it off from the middle chamber of the joint. The middle chamber is formed by the patella above and by the ligamentum mucosum with its alar ligaments below forming a diaphragm across the joint by extending from the front of the joint to the condyles of the femur behind. The third or posterior chamber lies behind this diaphragm, between it and the posterior ligament of the knee-joint. It is complex, as the crucial ligaments project into it from the posterior wall, like a partition which does not reach the anterior wall and imperfectly divides the chamber into two lateral halves, communicating in front.

Fig. 12. — Sagittal section of knee, showing the three main chambers in it: suprapatellar, middle, and posterior.

When the knee is distended all three chambers communicate with each other. The patella is raised from the femur by the fluid distending the joint, throwing the upper and middle chambers of the joint into wide communication. The progress of the communication is directly proportional to the tension in the joint; but as the joint is tapped and the distention lessened these cavities cease to communicate so freely. It is quite impossible to empty the knee-joint by tapping. The suprapatellar and the middle chamber can be emptied but not the posterior. It is in the nooks and crannies of the complex third and posterior chamber that the organisms of infection will find most peace and quiet to enable them to multiply and grow strong. This is the most important chamber to empty and at the same time the most impossible. Who wonders that treatment by the tapping of the knee-joint is ineffective? It is like removing the smoke but allowing the fire to burn. Almost its only use is to supply a specimen of fluid for examination.[5]

Let us apply this knowledge to the lavage of a septic joint. For success it is desirable, if not absolutely necessary, to wash out thoroughly the posterior chamber of the joint. This cannot be done while the ligamentum mucosum and the alar ligaments are intact, so they must be cut away or the femoral attachment of the ligamentum mucosum separated, then carefully all the nooks and crannies of the complex posterior chamber of the joint washed out, this being done, if at all possible, without cutting away the ligamenta alaria, because of the oozing of blood which may take place afterward. For similar reasons the synovial membrane above the patella should be closed with continuous catgut suture. It prevents blood from the loose tissue between the crureus muscle and the suprapatellar pouch of synovial membrane entering the joint cavity. The surgeon should avoid, if possible, splitting the synovial membrane over the pads of fat below the patella. If he does split them, the edges must be sutured. I suture the rectus muscle above the patella with another suture, which is continued over the patella to join the halves of that bone and of the ligamentum patellae (Fig. 4). The bone requires nothing more. Wiring is not needed. Yet in the great majority of cases a roentgenogram taken shortly after operation shows no obvious injury to the patella. The skin is closed by a method devised to insure the complete and rapid closure of the wound. The sides of the wound are approximated with two, three, or four mattress sutures of catgut. These edges are then coapted by a continuous suture of catgut, the stitches being inserted close to the skin edge and to each other, securing the almost immediate sealing of the wound. Movements may be commenced at once; and after twenty-four (or twelve) hours all dressings can be discarded.

I have experimented with many catguts. Those whose sterility is acquired with chemicals, for instance, chromic acid, mercuric chlorid, etc., are unsuitable. As the catgut is absorbed minute doses of these chemical irritants are set free in the wound, yielding in many cases a moist, almost eczematous, condition of the superficial wound. Iodin catgut is better, but the gut can be so hardened by iodin as to be almost unabsorbable. The wounds, however, are drier. In fact, plain iodized catgut sterilized by heating in some non-irritant fluid, for instance, xylene (xylol), seems to be best suited for this purpose. The stitches need never be removed. Suture without drainage is best; but the wound, not the joint, can be drained in the upper part of the wound by a tube inserted into the areolar tissue between the quadriceps muscle and the joint. If drainage should become necessary later it can be done in the popliteal space and always a few days after operation.

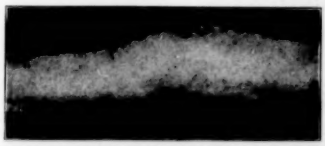

Fig. 13.—Leg fourteen days after operation, extended.

Fig. 14.—Leg fourteen days after operation, flexed.

In all cases with pyrexia the popliteal space should be examined at every dressing and compared, for fulness, with the popliteal space of the other leg. Pus escapes easily from the posterior chamber of the knee-

5. Corner, Edred M.: Clinical Lecture on the Treatment of Joint Disease, Med. Press and Circular, May 13, 1914, p. 484.

joint along the azygos vein into the popliteal space. In the popliteal space it is shut in by the dense, tough popliteal fascia which forms a roof over it, causing it to travel by the way of least resistance up the thigh under the hamstring muscles and down the leg under the gastrocnemius. The overlooking of the escape of pus or any infective material from the knee-joint into the popliteal space is very easy and its results, owing to its deep extensions, are very disastrous, often leading to the loss of the limb or to pyemia. I would strongly urge that it is better to make even an unnecessary incision in the popliteal space than run the risk of overlooking this escape.

TREATMENT

1. *Stretched or loose crucial ligaments.* This is almost invariably the anterior. With a drill a hole is driven through the external condyle and through the loose ligament. On it an unabsorbable suture is threaded and one end drawn through the condyle. The other end is passed once around the ligament and the end withdrawn, *secundum artem*, through another hole made through the external condyle, not far from the first. By tightening this suture the corresponding crucial ligament is tightened or reefed. A similar maneuver would tighten a loose posterior crucial ligament, but I have never found it necessary to do so. That ligament seems almost invariably to escape and it would seem that the anterior crucial ligament is stretched and ruptured before the posterior can be hurt.

I do not believe that there can ever be a stretching or rupture of the posterior ligament unless the anterior yields first.

By tying the suture the ligament is reefed and made tighter. The suture is tied with the knee a little flexed, as when the ligament is tightened in this position, the joint will be extended subsequently but little beyond it. Patients all admit that this strengthens their knee. The holes are drilled through the external condyle to tighten, or reef, the anterior crucial ligament; because that ligament is attached to that condyle. The posterior crucial ligament would be "reefed" through the internal condyle.

2. *The semilunar cartilages.* When a knee-joint is injured many structures within it may be affected, and from time to time it becomes necessary or advisable to remove a semilunar cartilage. The figures for St. Thomas' Hospital, London, show that it is sixteen times more frequent to operate on the internal cartilage than on the external. The operation of removal of the cartilage can best be done through a comparatively small incision on the corresponding side of the joint. Clinically one is sure that if the cartilage suffered sufficient damage to fracture or dislocate it, other structures in the joint will also have been injured. If the injuries to these structures cannot be put right, the result of the operation on the cartilage will be unsatisfactory. I would urge that, in certain cases, the asymmetrical local incision for removal of the cartilage be not made, but a median one, such as that of splitting the patella longitudinally, be made so that everything in the joint can be examined. Particularly is this so where the clinical diagnosis is vague, such as "internal derangement of the knee." By this method there is very excellent demonstration of the joint and I have found wonderful and undiagnosed fractures and dislocations of the cartilage, intra-articular fractures of the femur, "foreign" bodies, injuries to the crucial ligaments, fractures of the spine of the tibia, and so on. If the work is done thoroughly there is less danger of doing it without satisfaction to the surgeon or patient.

3. *Internal derangement of the knee.* When the knee is injured the resultant traumatism falls on many structures, not on one. It is more or less comparable to internal derangement of the abdominal viscera, enteroptosis. It is therefore necessary to open the joint thoroughly and see what is the matter and take steps to correct it. The faults in a knee-joint may be many: injury or dislocation of the semilunar cartilages, injuries to the crucial or other ligaments, intra-articular fractures of the femur, fractures of the tubercles of the spine of the tibia, and, if the case has gone on long, hypertrophied fringes of the synovial membrane, or loose bodies may be present. One must not be satisfied with finding one fault, many may need to be corrected. From the point of view of prognosis, diagnosis and treatment, the median and general incision is to be recommended, as it allows of a wider and more exact line of conduct.

There is one point especially to which I would like to refer. Certain patients feel that the knee is not strong, is not to be trusted, gives way unaccountably. In these patients at operation it is found that the anterior crucial ligament is "slack," having been injured, stretched, or partially torn, and that an elevator is easily thrust between the internal condyle of the femur and the tibia. The condyle, by slipping on the tibia, gives the patient the feeling of insecurity and untrustworthiness in the knee and accounts for the knee giving way and the patient falling. Let that crucial ligament be rendered taut, or reefed, and the knee will be much strengthened. In fact, the surgeon may feel sure that at the operation the ligament will be "overreefed" and the patient slow in recovering full movements of the joint because of the overtight ligament. This merely necessitates a longer convalescence but with as good result. I would say that it is better to overreef than underreef the ligament. By overreefing the surgeon has something in hand which he can afford to let go—his patient is above the line of security; an underreefer has not, and his patient is below the line of security.

Of recent years, since it has been proved that the operation can be done safely, it has unfortunately become the custom to remove internal cartilages from the knee-joint with comparatively little thought. Indeed, one feels that at times the cartilage is removed with even less consideration than the appendix. The patient is almost always better temporarily, owing to the postoperative stiffness and apparent strength of the knee. The existence of such a state of affairs is perfectly natural in the evolution of surgery; but it is no great credit and the sooner it is modified by some method enabling the surgeon to take a wider and more general view of injuries to the knee, the better. To how many doctors is injury to the knee synonymous with injury to the semilunar cartilage?

4. *Intra-articular fractures of femur.* They consist of fragments broken off, usually from the internal condyle. This part of the femur is much more liable to injury than the external condyle. Hitherto the practice has been to remove the fragment, and I have followed it, but I believe that the proper treatment is to replace the fragment and maintain it in position by a rectangular catgut stitch passed through the condyle of the femur. I cannot think that depriving the

articular surface of the condyle of a square inch or more of cartilage can be beneficial to the joint. Indeed, I believe it to be a common cause of chronic synovitis after injury to the joint.

It is noteworthy that both the internal condyle and the internal semilunar cartilage are much more often injured than are the corresponding parts of the other side. The explanation is found in the more extensive movement of the internal condyle of the femur on the tibia, the greater amplitude of movement offering more chances of injury. Rupture, complete or partial, of the crucial ligaments, particularly the anterior, would result from the superlative exaggeration of such rotation of the knee. It can be easily understood that such an extensive and violent rotation is hardly possible. So any injury to the posterior crucial ligament is very rare.

5. *Fractures of the spine of the tibia.* The subject of fractures of the spine of the tibia and rupture of the crucial ligaments of the knee has been reviewed and made the subject of a masterly paper, such as we should expect, by Robert Jones of Liverpool and Alwynne Smith of Winnipeg, in the first number of the *British Journal of Surgery*, July, 1913. In it they record seventeen cases which they have seen in the last three years—a truly large number, which tells that we humbler mortals fail to recognize the true nature of the cases we see. They urge that these cases should be treated conservatively. Perhaps this is the mature wisdom of more years than those of which I can boast; but I never like to leave blood in a joint, and a loop of catgut to form a rectangular intra-osseous suture in the tibia to anchor the detached spine would seem to me to be more in keeping with the surgical practice of to-day than the removal of the detached bone: the convalescence would be shorter, and the functional results should be better.

Some authors speak of detachment of the ligamentum mucosum from the femur as an item in the internal derangement of the knee. I have had no clinical experience of it except as an incident in much more serious injuries. I would regard its presence as an indication that the joint had been severely injured and that other injuries were to be looked for, if not actually present.

ABSTRACT OF DISCUSSION

DR. JOHN B. MURPHY, Chicago: Mr. Corner's paper is certainly a distinct, positive statement of the line of procedure that should soon become a habit. We have been too fearful of opening joints. We have been too willing to accept the external physical evidence and later the Roentgen ray evidence as to the lesions in the joint. If I were to give a percentage I would say that between 40 and 50 per cent. of the later cases of knee-joint lesions which incapacitate the patients have no Roentgen ray or other signs sufficiently positive to justify a procedure from that evidence alone. That is why the line laid down by Mr. Corner is one that is going to be followed. The lateral is not nearly so good as the median incision. It took us a quarter of a century to learn the technic of conservative exploration of the peritoneum, not to touch the surfaces except when there is an absolute necessity for it. One should not keep sponging and rubbing and handling the synovial membrane of a joint more than one would a peritoneal surface under the same circumstances. If it is done as much as with the peritoneal surface great effusion will follow the operation. Do all of the work with instruments without sponging, handling or manipulating the synovial membrane. That is the key to the work. The median division of the patella and its ligaments above and below is no more serious than the division of the bone in any other position after one learns. I was particularly interested in the fractures of the spine of the tibia. Visitors to my clinic will recall that I had two patients of this type in which I had exostosis after the fracture so that it incapacitated the patient and had to be removed by the chisel through the joint. We are only beginning to appreciate the significance of recurring traumas in joints, as pinching of the capsule, fracture of the semilunar cartilages, intra-articular villous formations, etc. Recurrent mild internal traumas in joints are extremely injurious to the synovial membrane and induce hypertrophy, fibrosis, synovitis, etc.

DR. HENRY O. MARCY, Boston: Mr. Lister taught me when I was his first American pupil that it was not so serious a thing to open the knee-joint as had been earlier supposed. To open the knee-joint in the early days of surgery was considered entirely beyond the realm of correct operation. When in 1880 I reported 150 operations on the knee-joint I hesitated to read the paper. I expected only criticism and no approval. Dr. Rowe said "To-day we have learned a new chapter in operations on the knee-joint." Dr. Sayre said to me "You have made a devil of a row in my line of surgery to-day," and that was an expression of the possibilities of opening the knee-joint at that time. The operations on the crucial ligament are something quite new to me.

DR. FREDERICK J. FASSETT, Seattle, Wash.: In opening a knee-joint through sagittal section I have been impressed with the close attachment of the crucial ligament to the cartilages. Would the crucial ligament play a part in the loosening of the semilunar cartilage? Given a diagnosis of a loose semilunar cartilage, would this be the incision of choice?

MR. E. M. CORNER, London, England: Do the crucial ligaments play a part in the loosening of the internal semilunar cartilage? The answer is yes, they do play a very great part. If the crucial ligaments in bearing the strain give way, no further injury is likely to occur. If the crucial ligaments stand firm then the semilunar cartilages, particularly the internal, will probably yield. You will meet in practice a mean between these extremes; partially lacerated, stretched or torn crucial ligaments and in direct degree with their slackness will the injury to the internal semilunar cartilage vary. The greater the slackness the less the likelihood of injury to the cartilages. The second question, concerning the median incision as the operation of choice for removal of the semilunar cartilage—if the clinician is absolutely certain in his own mind of the diagnosis of a dislocated semilunar cartilage, then he will do better to operate through the small local incision. The patient will get better sooner. If, on the other hand, the surgeon is not so certain or the knee-joint is not well after he has removed the internal semilunar cartilage, it is wise for him to decide on exploration of the knee-joint through the larger median incision. With regard to satisfaction after operation for semilunar cartilage, I would like to add a word of warning, namely, operation on the knee-joint gives a certain amount of postoperative stiffness and limitation of movement which may take weeks or months to pass off. This postoperative stiffness gives to the patient an impression of strength in the joint. Shortly after operation patients will tell you that they have a stronger knee. If you see these people, say a year and a half after operation, some of them will tell you quite a different tale. So that in deciding whether a case is satisfactory or unsatisfactory it is well to wait at least a year before making that decision.

The Individual Responsible.—That which is a common concern to all is very generally neglected. The energies of man are stimulated by that which depends on himself alone, and of which he only is to reap the whole profit or glory. In concerns common to him with others he employs with reluctance as much attention and activity as his own interest requires. He neglects that of which he thinks other men will take care, and as other men prove equally negligent, the common interest is universally abandoned.—Aristotle.

THE PHARMACOLOGY OF SODIUM TARTRATE *

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WASHINGTON, D. C.

Although the salts of tartaric acid are widely used in medicine and form an important constituent of some foods which may enter in our daily diet, only few attempts have been made until recently to learn its behavior in the body. Its general toxicity received only casual attention, while its action on various organs was confined to a few experimental tests on the circulation and some studies on peristalsis. Within the last two years, however, the attention of a number of workers, all in this country, was directed to a study of the action of the tartrates.

In 1912 Underhill[1] reported a series of very interesting experiments with sodium tartrate on rabbits and dogs. He found that about 1.0 to 1.2 gm. per kilo given by subcutaneous injection to animals with phloridzin diabetes or to fasting non-phloridzinized animals caused a very marked tubular nephritis, but no changes were observed in the glomeruli except an occasional small hemorrhage.

In the course of investigations on the toxicity of some of the heavy metals which Dr. Smith[2] and I have carried out about the same time, the need of using the tartrates of these metals presented itself to us. In order to determine their proper action it was found necessary, however, by way of preliminary studies, to acquire more information concerning the action of the anion. In experiments on rabbits I noticed that sodium tartrate produced marked urinary changes, indicating renal disturbance, which may be modified by diet. We also pointed out that the resistance of cats was much greater than that of rabbits.

Later Underhill, Wells and Goldschmidt[3] reported experiments with tartrates in which the effect of dosage, starvation, phloridzin and alkali on the production of nephritis by tartrates was studied. They also made observations on the influence of mode of administration. The changes they noticed were confined mainly to the epithelium of the convoluted tubules and to a less extent to the tubules of the loops of Henle, but no other lesions were observed, thus fully corroborating their previous findings. That phloridzin had no influence on the production of tartrate nephritis was shown by the subcutaneous injection into fasting rabbits of approximately the same amounts of tartrate as injected into phloridzinized rabbits. It may be remarked that the tartrate was injected the day after food was withdrawn and the animals were killed one to three days later. Experiments on well-fed rabbits consisted in the subcutaneous injection of from 0.5 to 1.0 gm. of Rochelle salt per kilo. The animals were killed three days later. These investigators claim that fasting rabbits are more susceptible to the action of tartrate. Examination of their reports of the histologic findings failed, however, to show any difference between fasting and well-fed animals. When given by mouth approximately 3 or 5 gm. per kilo of Rochelle salt, administered to rabbits which fasted three days, caused diarrhea and coma in twenty-four hours, death in thirty-six hours. In general, the character of the change produced was the same as by subcutaneous injection of an effective dose. The authors maintained that starvation also decreases the resistance of the animals to tartrates when given by mouth. The protocol, however, hardly justifies such a conclusion. The differences observed are not marked and they may be due to individual variation. The experiments on the influence of alkali treatment were made with doses of 0.5 and 1.0 gm. per kilo of tartaric acid, neutralized with sodium carbonate. Only one experiment and one control were reported with 1.0 per kilo, which is obviously not enough for drawing any conclusion, while the smaller dose is not controlled at all. In all the

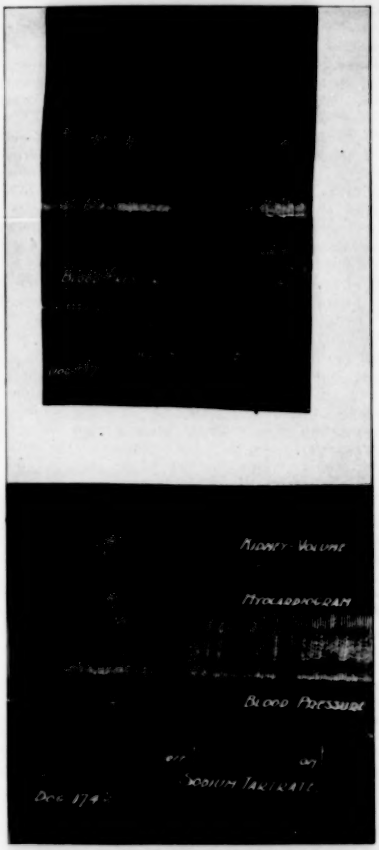

Fig. 1.—Tracing showing the rise of blood-pressure, increase of kidney volume, and slight cardiac depression produced by sodium tartrate when injected intravenously (femoral vein). Both dogs were curarized and under morphin-ether anesthesia. Upper tracing shows effect of 2 c.c. per kilo, and lower tracing 1 c.c. per kilo of a 10 per cent. solution.

* From the Pharmacological Laboratory of the Bureau of Chemistry.
* Read before the Section on Pharmacology and Therapeutics at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

1. Underhill: Jour. Biol. Chem., 1912, xii, 115.
2. Salant and Smith: Proc. Soc. Exper. Biol. and Med., 1913, x, 70.
3. Underhill, Wells and Goldschmidt: Jour. Exper. Med., 1913, xviii, 322.

other experiments by subcutaneous injection they gave larger doses as was stated above. It is possible, therefore, that the milder effects when tartrate and alkali were given were due to the size of the dose.

Pearce and Ringer[4] produced nephritis in dogs by means of sodium tartrate which was given subcutaneously, intraperitoneally and by mouth. Complete suppression of urine, or diminished urinary secretion with albumin and casts were observed. The histologic changes in the kidney consisted of necrosis of the convoluted tubules, fatty changes in the loop of Henle and in the collecting tubules. According to their observations the glomeruli were also involved. This change, however, was not present in all their animals. The capsule of Bowman was greatly distended and the tufts were compressed, but no structural alterations were noticed. After a dose of 7 gm. Rochelle salt was given by mouth, marked nephritis and death in less than twenty-four hours resulted. On the other hand, after 15 gm. tartaric acid as the sodium salt, diarrhea was the only effect noticed. The amounts injected by other paths varied between 10 and 15 gm. of Rochelle salt. The duration of life was seventy-eight hours in one dog and twenty-five minutes in another. Three of them lived eighteen, nine, thirty-six hours.

More recently Post[5] carried out a series of tests with tartrates on the human subject. He failed to notice any deleterious effect even in nephritis with doses of from 8 to 24 gm. of Rochelle salt.

My own observations with sodium tartrate have shown that doses of 0.4 to 0.8 gm. per kilo of the neutral salt may produce renal disturbance and even death in rabbits which have been receiving a diet of oats for several days before and during the experiment. Albuminuria was present in some animals and death resulted in one series of experiments in 70 per cent. of the animals receiving a dose of 0.4 gm. per kilo. The kidneys of such animals were much enlarged. The weight of several of them was increased from 50 to 100 per cent. They were soft and whitish in appearance. The glomeruli were compressed, some of them occupying only one-fourth the capsule of Bowman. Congestion, varying in degree, was almost the rule. It was observed when small, as well as when larger doses were given. The convoluted tubules were involved, but degenerative changes which were observed with small doses, 0.6 to 0.8 gm. per kilo, were moderate in extent. The injection of 1.0 to 1.2 gm. of sodium tartrate per kilo was invariably followed by symptoms pointing to severe affection of the kidney. Diminished secretion of urine or anuria which appeared within twenty-four hours was the rule in animals which received such doses. Albuminuria, varying in degree, usually developed in such cases and persisted until the death of the animal, which took place in six to ten days. Such amounts produced very marked degeneration of the epithelium of the convoluted tubules. The straight tubules were also affected but the damage inflicted was usually a great deal less than in the convoluted tubules. In some instances, especially chronic cases, proliferation of connective tissue cells was also noticed. In experiments with such doses, 1 to 1.2 gm. per kilo, by subcutaneous injection, muscle and nervous symptoms were also observed. Forced movements, ataxia, paralysis and convulsions developed in these animals several days after receiving tartrates. The effect of diet received some attention in our studies with tartrate. It was observed that cabbage-fed animals were slightly more resistant than those which were fed oats. But the difference in toxicity was very striking when sodium tartrate was administered to animals which were given for several days previously an abundant diet of carrots. In carrot-fed animals which received 2.5 gm. per kilo of tartrate, symptoms were absent. Their appetite continued good, and except for an occasional trace of albumin no abnormality was observed. A number of explanations suggest themselves. The large amount of water ingested with carrots may be thought of as the cause, but this is not likely since the toxic effect was noticed in animals which drank considerable amounts of water, as much as 186 c.c. of water in one day, and yet 1 gm. of sodium tartrate per kilo proved to be fatal when the animals were previously fed oats.

Fig. 2.—Tracing showing the depressing effects of perfusing the isolated frog heart for 30 seconds with sodium tartrate solutions of concentrations varying between approximately 1 per cent. (N/10) and 0.025 per cent. (N/400).

The alkalinity of the diet is another possibility, but the simultaneous administration of sodium carbonate did not yield very positive results. The large amount of sugar in the carrots and consequent accumulation of glycogen in all probability plays an important part in decreasing the toxicity of this substance. This is, however, a tentative hypothesis only. Experiments on the toxicity of sodium tartrate when administered by various methods indicate that the effect when given by mouth is considerably less than when injected subcutaneously; from 3.5 to 4 gm. per kilo failed to produce any effect. A dose of 5 gm. per kilo, however, was fatal to some rabbits. The toxicity when given by vein varied with the rate of injection. Acute symptoms, such as muscular twitching, dyspnea and convulsions, appeared after 1.5 to 2.2 gm. per kilo of an isotonic solution was introduced. Diarrhea never occurred after intravenous injection. Experiments show that its effect on the circulation and the isolated heart is that of a cardiac depressant.

4. Pearce and Ringer: Jour. Med. Research, 1913, xxix, 57.
5. Post, Wilber E.: The Effect of Tartrates on the Human Kidney, THE JOURNAL A. M. A., Feb. 21, 1914, p. 592.

In experiments on the intact animal under ether or chloretone anesthesia I found that the injection of sodium tartrate in various concentrations, from 2.5 to 10 per cent. and 20 per cent., the force of the heart was considerably decreased. The frequency was slightly diminished or remained unchanged. One c.c. per kilo of a 10 per cent. solution caused a marked decrease of amplitude. But in some experiments smaller doses produced the same effect. In one dog

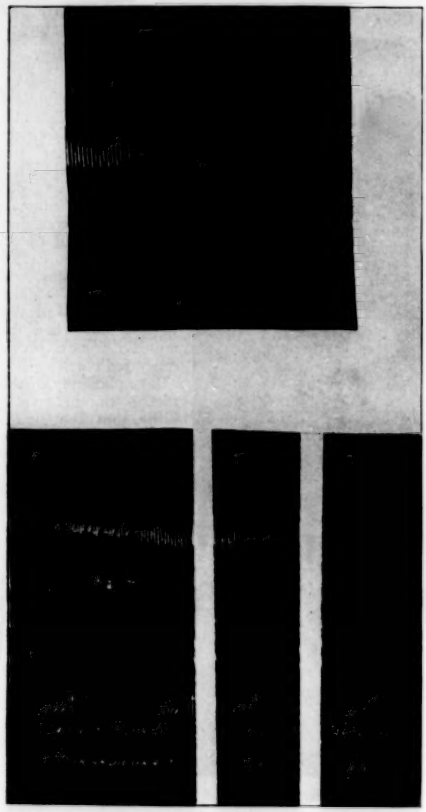

Fig. 3.—Upper tracing shows the depressing effect of sodium tartrate on the heart, the record being taken by means of a Cushny myocardiograph, with the heart *in situ*. Lower tracing shows the antagonistic action of calcium chlorid and sodium tartrate when injected intravenously. Dog under chloretone anesthesia.

weighing 9 kilos, the intravenous injection of 15 c.c. of a 2.5 per cent. solution of sodium tartrate under chloretone anesthesia produced a decrease of 25 per cent. in the amplitude of the heart as measured by a Cushny myocardiograph. Recovery was the rule in our experiments. The rate of injection had an appreciable effect. The more rapidly the solution was introduced the more marked was the depression. Blood-pressure was moderately increased in most instances when ether anesthesia with morphin or curare was employed. No effect with tartrate on blood-pressure was observed when chloretone was employed as an anesthetic. Oncometric measurements of the kidney have invariably shown considerable increase in volume. Attention may also be called in this connection to some observations with calcium chlorid. The antagonistic action of calcium and the oxalate has been shown by a number of investigators. Some workers explained the action of the citrates and tartrates by the chemical property of these substances to form calcium compounds that are insoluble or are not dissociated. Experiments with a calcium chlorid solution have shown that it is antagonistic to sodium tartrate, as it counteracts the effect on the heart as well as on blood-pressure.

The effect of sodium tartrate on the isolated heart has been studied by Karczag,[6] who made experiments on the heart of the turtle. He reported that hundredth-normal tartaric acid in Ringer solution produced heart-block and decreased cardiac action. Gros[7] recently reported experiments showing that tartrates also produce depression of the frog heart. I have carried out a systematic study on the isolated heart of the dog, cat and frog. Sodium tartrate, even in very dilute concentration, was found to be a cardiac depressant. A solution of three-hundredth-normal perfused through the frog's heart for from thirty to sixty seconds produced a distinct though not a very pronounced diminution in amplitude. With the increase of the concentration there was greater decrease in the action of the heart which was not, however, proportional. A solution of hundredth-normal decreased the amplitude 40 per cent. After perfusion for the same length of time with a tenth-normal solution the effect was a little more than twice as great. The action varied also with the length of time perfused, cardiac depression being more marked when larger intervals were employed. No adequate explanation of the action of sodium tartrate can be offered at present. Although our experiments show very decidedly the antagonistic effect of calcium under certain conditions, it utterly fails to account in some cases for the action of sodium tartrate.

I am very much indebted to Mr. Selig Hecht, Graduate Scholar, Harvard University, for valuable assistance in some of the experiments of this investigation.

6. Karczag: Ztschr. f. Biol., 1909, liii, 218.
7. Gros: Arch. f. exper. Path. u. Pharmakol., 1913, lxxi, 397.

The Limitations of Statistics.—A series of hundreds of operations, tabulated and arranged and nicely rounded off in terms of percentages, always seems to me to possess but very limited value, so limited, indeed, that it is strictly confined to one person—the surgeon who performed the operations; and even he can learn nothing from the contemplation of his tables when he has compiled them. The rich experience he will have gained cannot even be expressed in that way; much less can it be imparted to others, for it will consist actually in the sum of a multitude of observations of individual cases, all of them slightly varying one from another, but all of them obeying pathological laws which are fixed, and which never vary. After all, it is not the fact of performing a large number of operations that in itself constitutes real experience, unless in addition the surgeon who performs them possesses the qualities that are essential for a good clinical observer.—R. Hamilton Russell, *British Medical Journal*.

STUDIES IN INTESTINAL OBSTRUCTION

WITH A REPORT OF FEEDING HETEROLOGOUS JEJUNAL AND ILEAC CELLS TO A HUMAN BEING *

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NEW YORK

To Roger we are indebted for the present conception of the cause of death in intestinal obstruction. He was undoubtedly the first to conceive of it as a true auto-intoxication.

In a paper read before the Johns Hopkins Medical Society seven years ago and based on a study of the effects of 400 duodenal obstructions produced in animals at the Surgical Research Laboratory at Columbia, I reported corroborative evidence, from a surgical aspect, of Roger's view. William Welch on opening the discussion of my paper said that, if corroborated, the facts presented would show that the duodenum had a function hitherto unknown and one evidently of the utmost importance in medicine. It is gratifying that this corroboration has just recently come from Dr. Welch's own laboratory at the hands of Whipple and his associates. By a series of skilfully devised experiments, these investigators have succeeded in casting much more light on this interesting problem than either Roger or I had been able to do, and the sum of our investigations taken in the aggregate seems now to offer incontrovertible proof that the cause of death is not bacterial in origin, but truly autotoxic from the cells of the epithelium of the intestine itself.

Perhaps no branch of medical research better illustrates than this one the advantages derived from having men with one object in view working at different centers of education toward the solution of a common problem. The different points of view ultimately arrange themselves on convergent lines so that when the answer is finally won it is evidently not the product of one man's aims or ambitions, but a homogeneous unit, resulting from the constructive work of several minds. For no single individual can expect to do much more with a modern problem than to advance it a single step. This problem also serves to demonstrate the rapid breaking down of the traditional barriers between medicine and surgery, forecasting the ultimate fusion of these old and arbitrary subdivisions into a new unit, the members of which will have a working knowledge of physiologic chemistry and its allied sciences in addition to requisite technical skill. Furthermore, it demonstrates that modern surgery, like physiology, does not consist in the manufacture and use of instruments of mechanical precision but in philosophical interpretation of natural phenomena.

The various old and groundless theories as to the cause of death in intestinal obstruction have one by one been disposed of, with the possible exception of the exact origin of the toxemia. Is it bacterial, or purely autotoxic from the cells of the intestinal epithelium itself? Were it not for the views of Fred Murphy, which result from his studies at the Washington University and which bear evidence favorable to the bacterial theory, one would be ready to accept the result of the painstaking and thorough researches at the Cornell laboratories of Hartwell and Hoguet who seem definitely to have excluded the anaerobes, and of Whipple and his associates at the Hopkins laboratories, who are disposed to rule out all bacteria as causative agents in the development of the toxemia. From the prosaic and common sense point of view of applied surgery, it is hard to understand why obstruction in the duodenal region should be many times as dangerous as obstruction in the colon. It has long been known that duodenal contents may be allowed to escape into the peritoneal cavity without danger, but that peritonitis is to be expected if any colonic contents escape.

No careful observer could watch the death of a series of duodenally obstructed dogs without noticing the close similarity between the ante-mortem symptoms of this condition and those seen after parathyroidectomy or long remain in doubt that the function of the liver was greatly impaired in each.

The accompanying tables are based on the study of the urine of duodenally obstructed dogs, both before and after a large dose of camphor had been given hypodermatically. The recovery of the paired glycuronic camphor has been made by the method devised by Tollens. I am indebted to Frederick W. Schlutz of the University of Minnesota for the privilege of presenting these results, which are a chronicle of his chemical studies made on dogs obstructed by me. In a previous communication we have jointly presented two similar studies, both of which appear to show more conclusively than the present ones that liver function was impaired. Negative findings, reported of carefully wrought work, are, however, just as valuable as positive findings, particularly in the case of a method which is as yet open to some question as to accuracy, and which is certainly open to criticism as regards the time taken in working it out. Dr. Schlutz is carrying on further studies of the accuracy of Tollens' method. As indicated in Table 1, the discrepancy between this report and our previous findings, in which the liver function, as indicated in terms of camphor-glycuronic was considerably lowered, may be due either to inaccuracies in the method itself or our application of it, or to the fact that we were unfortunate in having one of our dogs live but a very short time while the other one lived an unusually long time. Dr. Schlutz will make a

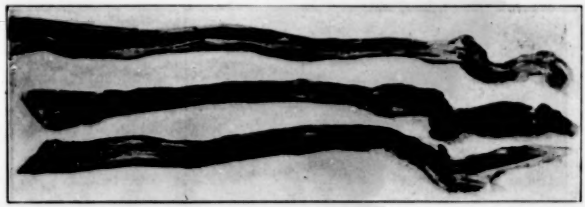

Fig. 1.—Above, the split colon of a normal dog; in the middle, the split colon of a dog salivated for four days by pilocarpin, and below the split colon of a dog dying from acute duodenal obstruction.

* From the Laboratory of Experimental Surgery, New York University.

* Read before the Section on Pathology and Physiology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

further report which will clarify this interesting question.

When Hartwell and Hoguet advanced their hypothesis that water privation was the chief lethal factor after intestinal obstruction, at the suggestion and with the help of George Wallace we conducted some experiments to determine the exact water percentages in the tissue of dogs under various conditions. It was thought that salivation by pilocarpin, fasting, and duodenal obstruction might cause approximately the same water-loss to the tissues. Table 3 shows the results from six tissues, namely, liver, lung, heart, kidney, spleen and muscle. It is seen that within a few tenths of 1 per cent. the water-loss after pilocarpin, after fasting, and after death from duodenal obstruction was the same, namely, 10 per cent. In the case of the salivated dogs and the fasting dogs, euthanasia was practiced on the fourth and seventh day, respectively, long before there were any signs of disability. On the other hand, the duodenally obstructed dogs were allowed to die of their autotoxemia, so Table 3 gives the maximum water-loss for obstruction but not for salivation or for fasting.

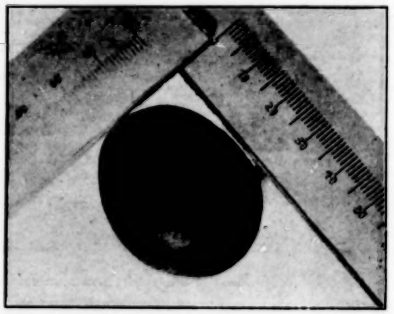

Fig. 2.—Acute jejunal obstruction in dog. Stone swallowed six months before operation, causing chronic stomach symptoms, but no obstruction until it slipped into the bowel. Note partial digestion of soft area by gastric juice. Recovery followed removal of pebble and feeding of dog with jejunal and ileac epithelium.

These studies appear to offer additional proof that in intestinal-obstruction toxemia, as in other toxemias, whether bacterial or truly autotoxic in origin, the solvent power of water on the toxins and its help in eliminating them from the body serve in many cases to prolong life, and, under certain conditions, to save it. Indeed, Wallace has shown that an animal may be given double the lethal dose of diphtheria toxin and yet live, if treated by abundant hypodermoclysis. But while valuable from a therapeutic point of view they cast no light whatever on the origin or the nature of the toxins. Furthermore, it has been the clinical experience of all surgeons that even an abundance of water will not serve to save the life of a human being in whom there had existed for any length of time complete duodenal obstruction.

We have again subjected to careful microscopic study the liver, heart and kidneys of a large number of obstructed animals and find that except for capillary dilatation they appear normal. In this connection as well as in the conduction of the feeding experiments, I acknowledge the efficient help of Dr. Eisberg. These microscopic findings are simply corroborative of previous reports made by myself and others. The beginning and end of the alimentary canal, however, on its epithelial surface, shows this capillary dilatation so markedly as to attract the eye on gross examination. I have shown a colored photograph of a stomach removed from a duodenally obstructed dog at the Mayo Clinic. I have shown and called attention to this before, without knowing its importance or significance; and because of its bearing on certain data which I shall present later, I am glad to say that the observation is corroborated by Whipple. In our necropsy experience the small intestine has shown little if any, gross change, but the colon is almost invariably affected and in a very characteristic manner. I understand from Wallace that the same condition obtained after a lethal dose of diphtheria toxin had been given.

TABLE 1.—INTESTINAL OBSTRUCTION, DOG 201: LIVER FUNCTION IN TERMS OF GLYCURONIC CAMPHOR (TOLLENS), SCHLUTZ-DRAPER SERIES

Date of Experiment	Length of Period, Hrs.	Vol. of Urine, c.c.	Normal Amt. of Glycuronic Acid	Amt. actually Passed as Combined Camphor Glyc. Acid	Increase Over Normal in Glycur.	Remarks
1-27-28	24	130	0.1794	.....	.....	2 gm. of camphor,
1-28-29	24	122	0.1092	.....	.....	A Theoret. total of 452 gm. Comb. camph. glyc. acid. 37.02 per cent. combined before, 3.64 per cent. obstruction.
	Camphor 2 gm. hypod. ½ 9-1912			3 p. m.		
1-29-30	24	147	0.1470	0.4428	0.2958	1 c.c. of normal undiluted urine = 0.0010 gm. glyc. acid.
1-30-31	24	215	0.2150	1.4094	1.1944	1 c.c. of normal diluted urine = 0.00028 gm. glyc. acid.
1-30-11-1	25	227	0.2270	0.4104	0.1834	
	Intestinal obstruction, 3 p. m. 7-1912; 24 hrs. later 2 gm. camphor hypodermically.					
11-1-2	34	900	0.9200	1.1772	0.2572	

Discrepancy with results previously reported may be due to short postoperative life or to inaccuracy of Tollens' method.

Thus it appears increasingly probable that the toxins of intestinal obstruction are eliminated both from the stomach and from the colon. When we recall the method of elimination by the stomach of morphin, its reabsorption by that organ and the value of frequent stomach-washings in the treatment of morphin poisoning, the post-mortem picture of intestinal obstruction is not so surprising, and the value of lavage and epithelial cell feeding in complete and incomplete obstruction as well as in acute dilatation of the stomach is more easily understood. It strongly suggests that most cases of postoperative dilatation are due to an adynamic duodenum, just as hydronephrotic dilatation of the kidney is often caused by physiologic ureteric obstruction. An organ dilates first at the point of obstruction to its outlet, be the obstruction mechanical or physiologic.

The capillary evidence of stomach elimination affords a working hypothesis on which we may

explain the interesting results of feeding to duodenally obstructed animals the epithelial cells from the ileum and jejunum of other animals. Table 4 shows the result, as regards the length of life, to be quite definite, the fed dogs living nearly twice as long as the controls. This series agrees with a similar series reported by me from the Mayo Clinic. It is not to be forgotten that scrapings from the frog's duodenum will stimulate pancreatic secretion in the higher vertebrates. Intercellular reactions must be among the most ancient and most fixed of our functions, and the feeding of intestinal cells may prolong life by reestablishing certain vital intercellular reactions which the obstruction had interrupted. Although knowing empirically that if jejunal and ileac epithelium were placed in the stomach of a duodenally obstructed dog, that dog would outlive one either not fed on cells at all or fed on cells of organs other than the small intestine. I could not previously understand this but it now seems probable that since the toxins are undoubtedly thrown out into the stomach they are directly rendered harmless by the heterologous cells from the small bowel derived from a healthy animal and are thus prevented from reentering the body. This explains the immediate benefits derived in the treatment of acute dilatation of the stomach and since this condition is undoubtedly due to physiologic duodenal obstruction, it seems probable that the feedings of these epithelial cells may prove to be just as useful in the treatment of dilatation as in the postoperative treatment of obstruction.

TABLE 2.—INTESTINAL OBSTRUCTION, DOG 202: LIVER FUNCTION IN TERMS OF GLYCURONIC CAMPHOR (TOLLENS), SCHLUTZ-DRAPER SERIES

Date of Experiment	Length of Period, Hrs.	Vol. of Urine, c.c.	Normal Amt. Glycuronic Acid	Amt. actually Excreted as Conjugated Camphor Glyc. Acid	Increase Over Normal in Glycur.	Remarks
1-27-28	24	116	0.1458	.....	.....	1.7 gm. camphor = a theoret. total of 3.842 gm.=comb. camph. and glyc. acid. 0.2 gm. camphor = 452 gm. comb. camphor and glyc. acid.
1-28-29	24	150	0.1548	.....	.....	
	1.7 gm. camphor in oil subcut.					
1-29-30	24	83	0.0913	1.2294	1.1381	Before obstruc. 44.56 per cent. of camphor comb. with glyc. acid.
1-30-31	24	100	0.1100	0.3582	0.2482	After obstruc. 47.64 per cent. were comb., but practically all in the first 24 hrs. after that markedly dim. function.
1-31-2-1	24	130	0.1430	0.2880	0.1450	1 c.c. of normal undiluted urine = 0.0011 gm. glyc. acid.
	Intestinal obstruction 4:30 p. m. 2/1/12					
2-1-2	24	55	0.0615	0.2424	0.1809	
	Camphor 2 gm. subcut. 2/2/12, 2 p. m.					
2-2-3	24	366	0.4026	2.3100	1.9074	
2-3-4	24	109	0.1199	0.2310	0.1111	
2-4-5	24	246	0.2706	0.2906	0.0200	
2-5-6	24	134	0.1474	0.2208	0.0724	
2-6-7	24	85	0.0935	0.1140	0.0205	
2-7-8	24	60	0.0660	0.0888	0.0228	

Postoperative life unusually long may indicate high liver resistance or inaccuracy in Tollens' method.

The study of Table 4, constructed from the last series, shows that it differs from the former series in that the pulse-rate of the different groups has been unaltered. A reasonable explanation of this is that the pulse was taken in the recent series at the femoral, whereas in the series reported from Rochester it was in each case taken at the apex. The femoral count is certain to be much lower when the heart is running high because many of the beats are not transmitted to the finger. While this series for the foregoing reason shows little change in the pulse-rate, it does show a much greater increase in the length of life, and this certainly is the best index of the effect of any treatment.

A glance at Table 4 shows that of the dogs fed with epithelium only two died before the hundredth hour, whereas of the controls only three lived beyond the hundredth hour. It is interesting to note that one of these lived 239 hours, showing that occasionally one finds an animal naturally resistant to duodenal obstruction. In the average this is balanced in the fed series by one which lived 284 hours, so that the general average remains unchanged and it is quite safe to say that the increase of life, which in this series is nearly doubled, is due entirely to the detoxicating effect of the epithelium.

In order to show that fed jejunal and ileac epithelium exercise some special detoxicating power not yet understood but definitely recognizable, we fed a control series of dogs on the emulsified cells of liver, spleen, pancreas and muscle-tissue. These animals lived a few hours longer than the not-fed controls, but it is evident that these cells had either no detoxicating action, or a very feeble one, compared with the intestinal epithelium. If we prove to have at hand

TABLE 3.—WATER PERCENTAGES OF SALIVATED AND DUODENALLY OBSTRUCTED DOGS ACCORDING TO TISSUE; SALIVATED SERIES, EUTHANASIA FOURTH DAY; FASTING, EUTHANASIA SEVENTH DAY; OBSTRUCTION SERIES, AUTOTOXIC DEATH ON FOURTH DAY (AVERAGE)

Tissue	Normal					Salivated (Pilocarpin)			Fasting 7 Days	Duodenally Obstructed					
	Dog	211	193	236	Aver.	205		Aver.	204	207	206				Aver.
Liver..	73.6	72.0	70.0	79.2	73.7	74.8	60.0	67.4	62.6	59.0	60.6	69.0	68.0	71.0	65.5
Lung..	....	80.4	68.2	84.3	77.6	71.2	79	75.1	76.8	72.8	66.8	....	....	....	69.8
Heart..	77.0	77.0	84.0	75.0	78.2	73.0	63.0	68.0	74.8	74.4	62.0	55.0	75.0	77.0	68.7
Kidney.	....	78.7	80.0	74.5	77.4	75.2	....	75.2	70.9	67.2	59.3	....	74	78	69.6
Spleen.	....	76.3	77.5	74.1	75.9	....	51.0	51.0	....	64.5	....	....	74.0	79.0	72.5
Muscle.	75.0	74.0	75.1	72.7	74.2	44.2	74.0	59.1	45.6	42.8	40.0	65.0	69.2	....	54.2
Average	....	....	....	....	76.1	....	....	66.0	66.1	....	....	....	....	....	66.7

Salivation, fasting and duodenal obstruction each cause 10 per cent. water loss, showing this factor to be negligible in death by obstruction.

some less cumbersome method than Tollens' for determining liver function, it would be interesting to use it as an index of the effect of feeding small intestine epithelium.

I have utilized jejunal and ileac epithelium clinically in two instances. First in a valuable female dog which had been imported from England about six months before, and had had "chronic stomach trouble" ever since her arrival. She, however, whelped a large litter of pups about six weeks before I saw her, without difficulty. She was a large poodle, weighing about 40 pounds. She had had complete intestinal obstruction for five days and she presented all the clinical symptoms which I have described, notable tachycardia, extreme nervousness, and great weakness in the hind extremities. On opening her, with the consent and on the advice of Dr. Blair, I removed from the oral portion of the small intestine and at a point not exactly determined, the pebble which is shown in the illustration. Her condition was very grave, the pulse running from 180 up and showing great irregularity at the apex. She was immediately put on small intestine epithelium derived from two dogs of a different breed. No one is justified in drawing any deductions from one case, but from a long experience with the symptoms of duodenally obstructed dogs, I should not under ordinary conditions have expected her to recover. The symptoms, however, gradually subsided and she lived.

TABLE 4.—FEEDING HOMOLOGOUS CELLS TO DUODENALLY OBSTRUCTED DOGS

Fed Jejunal and Ileac Epithelium			Fed Emulsified Liver, Spleen, Kidney, Pancreas and Muscle Tissue			Not Fed (Controls)		
Dog No.	Hours Lived After Obst.	Average Pulse	Dog No.	Hours Lived After Obst.	Average Pulse	Dog No.	Hours Lived After Obst.	Average Pulse
200	197	157	49	72	156	185	83	149
202	114	147	53	115	140	186	239	109
204	171	161	56	75	149	188	66	133
33	166	200	57	71	179	189	50	167
34	94	136	58	147	155	191	126	174
38	284	182	63	74	171	192	53	134
48	72	144	64	52	163	193	108	170
44	191	140	65	47	140	196	68	154
45	101	150	62	144	181	197	72	141
46	258	143	59	247	140	198	20	172
	1648	1560		1044	1574		885	1563
	164.8*	156†		104.4‡	157.4¶		88.5§	156.3‖

* Average hours of life when fed epithelium.
† Average pulse when fed intestinal epithelium.
‡ Average hours of life when fed emulsion of organs.
¶ Average pulse when fed emulsion of organs.
§ Average hours of life of control.
‖ Average pulse of control (at femoral).

The second instance in which I have used the epithelium therapeutically was in the case of a man referred to me by my colleague Jerome Lynch. The patient had had definite symptoms of obstruction for ten days, and when the abdomen was opened, an annular cancer was found which closed the terminal ileum. Not knowing whether heterologous epithelium would have any detoxicating effect, but remembering that the duodenal epithelium of frogs is capable of stimulating pancreatic secretion in the higher vertebrates, and realizing that this patient was in a desperate condition, Dr. Lynch and I decided to feed him the emulsion from a dog. Hourly doses were given until the entire epithelium from the two animals had been taken. The patient objected much more to some magnesia which we ordered, than to the dose of epithelium, which he described as "not half bad." The pulse improved and the patient lived. These cases prove nothing; they simply show that heterologous cells may be given without discomfort or harm.

Different operative procedures were used in each. In the first, the continuity of the bowel was reestablished and most of the pent-up products of obstruction were allowed to flow to the aboral portion of the intestine. In the second, owing to the patient's condition, it was found necessary to do an ileostomy, and all the obstruction products were drained to the surface. As I have already stated, it is by no means proved that because such products are toxic to other individuals, they are necessarily toxic to their host.

CONCLUSIONS

The power of the liver to pair camphor and glycuronic acid is probably seriously impaired after duodenal obstruction. This can be studied by the method of Tollens, which, however, is cumbersome and may be faulty. Such decreased power of camphor-pairing is presumably an evidence of impaired liver function. This, however, is not reflected in the histologic appearance, either grossly or microscopically.

The decrease in the water-content of the tissues in duodenal obstruction is about the same as obtains after salivation by pilocarpin for four days or after fasting for seven. As this decrease produced no visible change in either case before euthanasia, it is reasonable to believe that it produces none in intestinal obstruction. The loss is 10 per cent.

The toxemia in duodenal obstruction undoubtedly arises from an interference with cellular reactions of the intestinal epithelium. The toxins undoubtedly are at least in part eliminated from the stomach and colon. If small-intestine epithelial cells of healthy animals are placed in the stomach of duodenally obstructed animals, such animals have lived nearly twice as long as not-fed control animals. This evidence is strongly opposed to the bacterial theory of origin of the toxins.

In addition to the placing of jejunal and ileac epithelium in the stomach of postoperative obstruction cases, an emulsion of them should also probably be used in colonic irrigations for the same indication and purpose.

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ABSTRACT OF DISCUSSION

Dr. Joseph Colt Bloodgood, Baltimore: Dr. Draper's paper seven years ago made me think clinically about the duodenum in relation to some things we had observed in intestinal obstruction. In the beginning of surgery, we were dominated by anatomy, and then followed pathology. At present surgery does not look for much help to anatomy, except in certain regions, or even to pathology. We have about reached the limit of the microscope, but we do look for help to experimental physiology in the solving of problems which will be met on the operating-table. Perhaps, later, we will look to experimental chemistry. Surgeons, as soon as they conquered technic in surgery of the stomach, found that their patients did not die of peritonitis. As soon as they used anesthesia, the majority of their patients didn't die of shock and later of anemia, but up to the present there is one complication which has always bothered. If they do a posterior gastro-enterostomy a number of their patients vomit

the contents of the duodenum, because of some fault in the technic. Now its contents are washed out with the stomach-tube. These patients in the beginning died because we didn't know how to use the stomach-tube. There was no place for the duodenal contents to flow. They couldn't pass up into the stomach and couldn't come through the anastomosis because it was kinked, and these patients died within from three to five days. When I heard Dr. Draper's paper I couldn't understand some of the mortality after operations of that kind, either of my own or others. Patients going well on the operating-table, apparently absolutely comfortable for twenty-four or thirty-six hours, suddenly going to pieces, with no pumping, no distension or rapid pulsing that show in intestinal obstruction. That is a definite case of death from acute dilatation of the duodenum as a definite postoperative complication. If there is a patent pylorus we can relieve that with a stomach-pump when the pylorus is closed by section. Some surgeons are now advocating that posterior gastro-enterostomy is without an element of danger, and will not be followed by complications in two or three days. The operation has led to chronic dilatation of the duodenum, a terminal condition which is responsible for the ill-health of a group of patients. In the last three years I have recognized and operated on six. In the previous three years I didn't recognize three. The previous three died. The subsequent six have recovered, and the cause of the dilatation I have found has been a congenital defect in the mesentery to the ileum from the appendix and the giant cecum descending into the pelvis, and on account of the short mesentery of the ileum lying directly on the base of the mesentery section, which kinks the small intestine as it passes through to a junction with the duodenum, which produces a chronic dilatation with its symptoms. These patients have been relieved by removing the colon and taking away that heavy part and exposing the transverse colon so that it will do its work and be allowed to expand. This is a demonstration of what experimental physiology can do for practical surgery.

ROVSING'S OPERATION FOR CONGENITAL CYSTIC KIDNEY*

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My first acquaintance with congenital cystic kidney was gained in the dissecting-room of the Boston City Hospital, where I saw several necropsies on patients of middle and adult life who had come into the hospital in convulsions and died of uremia. In some of them, the enlargement of the kidneys had been noticed before death; in others, not, but at the necropsy the kidneys were found very much enlarged and studded with numerous cysts ranging in size from a pea to an orange. These cysts were yellow, green, red and brown, and the effect was very beautiful, making a pathologic specimen truly remarkable and imposing in appearance. These necropsy cases were bilateral, one kidney being considerably more enlarged than the other.

Cases in which gradual enlargement of a polycystic character takes place in middle life, and in which the patients present themselves to the surgeon on account of dragging pain and the presence of a tumor in the loin, or possibly on account of the mobility of the enlarged kidney, may suggest malignant disease of the kidney or hydronephrosis; and it is frequently only when they are cut down on that their true nature is revealed and the importance of a knowledge of their nature and treatment becomes evident. Such kidneys have not infrequently been removed, with the result that the patients have died of uremia, and the necropsy has revealed the presence of cystic disease of the other kidney, usually less advanced, so that a tumor was not felt before operation. A knowledge of the fact that this disease is usually bilateral might have saved the patient's life and the surgeon's discomfiture.

Congenital cystic kidney is a disease which frequently runs its course without a diagnosis being made during life, death occurring from uremia or cerebral hemorrhage due to kidney insufficiency. The real cause of the insufficiency is first discovered at the necropsy, when the enlarged cystic kidneys, not felt during life, are found by the pathologist. In fact, the course of the disease may be so latent that a patient in whom pathologic changes have not been suspected may be stricken with uremia or cerebral hemorrhage.

The term "congenital cystic kidney" does not include hydronephrosis, which is a dilatation primarily of the pelvis and sinus of the kidney from retention due to obstruction in the pelvis itself or the ureter, and does not concern the urinary tubules at all. It does not include cystic dilatation of the tubules due to contraction of the interstitial tissue, which sometimes accompanies a chronic interstitial nephritis. Here the kidney cortex becomes studded with little cysts, seldom larger than a pea, and not, as in the true congenital cystic kidney, greatly enlarged and varying in size. The cysts in interstitial nephritis play only a subordinate rôle and are secondary to scar contraction. Neither does the subject under discussion include the single or occasionally multiple cortical cysts which sometimes result from the absorption of embolic infarcts. In the true cystic kidney the organ may be enormously enlarged; for example, the cases in which they present an obstacle to parturition or in adults occupy half or two-thirds of the abdominal cavity. The whole organ, both cortex and medulla, is studded with cysts of various sizes, from that of a pin-head to that of a mandarin orange. The surface is knobby with cysts of different size and color. The walls of the cysts are thin and vascular, and the larger ones show folds on their inner surface, which are the remains of the walls of the smaller cysts which have coalesced to form them. The fluid consists of urine, since in it are found urinary constituents, such as uric acid and hippuric acid, calcic oxalate, cystin, leucin, and tyrosin; but in the larger cysts, this fluid is considerably diluted (probably by serum which has transuded through the walls), is albuminous, and contains blood, pigment, fat and cholesterin, in varying quantities, so that the color of the cysts may be red, brown or yellow, and the fluid in them more or less cloudy. Between the cysts are often found more or less extensive areas of normal renal parenchyma; other cysts are separated merely by fibrous tissue. In some cases with large amounts of parenchyma, we cannot distinguish between cortex and medulla.

The efferent passages which protrude into the calices or pelvis frequently show no changes, but in some specimens are shrunken and narrowed, and may be almost obliterated. Thin-walled cysts may sometimes be seen projecting into the pelvis, just as they do on the outer surface of the kidney. Microscopically, each cyst is lined with a single layer of flat epithelial cells, which in the smaller cysts correspond closely to a tunica propria. In the larger cysts this is not found, either because they have no proper wall, or because

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the cysts appear as dilatations in the interstitial tissue. The partitions between the cysts are so thin as to make it probable that the larger cysts have been formed by the coalescence of smaller ones. In some of the smaller cysts, glomeruli have been found attached to the walls, and flattened, but still permeable to injected fluid. It is thus evident that all portions of the tubular tract, from the glomeruli to the terminations in the papillae, are subject to cystic dilatation. The suggestion of certain investigators that these dilatations may arise by cystic degeneration of the interstitial tissue is not supported by recorded observations. That certain of the cysts show no epithelial lining is due to the fact that the epithelium is desquamated and disappears. In the smaller or younger cysts the epithelium is always found.

Cystic kidneys in adults and in the new-born are usually bilateral. If, as is rarely the case, the disease is unilateral, the other kidney is hypertrophied. The degeneration of the kidney may have an unfavorable influence on the development of the fetus, so that birth is premature. The child may die within a few moments of birth from respiratory failure, because of the interference with the movements of the diaphragm consequent on the tumor, or may live a few days, only to succumb to the same cause. Death may result early in these cases from renal insufficiency, the amount of normal functionating renal tissue between the cysts being insufficient for excretory purposes. On the other hand, the amount of normal renal tissue may be sufficient to prolong life for indefinite periods, perhaps decades, before renal insufficiency results in death. The most favorable conditions will naturally be presented by unilateral cases with compensatory hypertrophy of the opposite kidney, which unfortunately are rare.

In considering the etiology of this disease, we enter a field which has been fruitful of much discussion. The theory of Neuwerck, Hufschmidt and von Kahlden, that these tumors are cyst-adenomas, is negatived, it seems to me, by the fact that the cysts may often be demonstrated to be dilatations of the renal tubules, and contain urine, often diluted with serum, it is true, but showing distinct urinary constituents. The epithelial proliferations and connective-tissue growths, which Brigidi and Severi had relied on as evidence of tumor-growth or adenoma, have been shown by von Mutach to be tissues characteristic of embryonic kidneys. The presence of these proliferations, etc., therefore, is an argument in favor of the developmental rather than the neoplastic origin of the tumors. In order to explain these cases we have to assume, with Orth and others, the existence of some obstruction to the escape of urine from the dilated and cystic canals. The oldest theory, that of Virchow, that the urinary concretions, "uric acid infarcts," so common in the new-born, have plugged the canals, is untenable, since these are rare during intra-uterine life, and after birth so common that cystic kidneys, if due to them, ought to be much more frequent than they are. There seems to be no doubt, as Virchow himself acknowledged later, that we must assume an organic obstruction and actual obliteration of the tubules. Orth agrees with Virchow's later view, that the condition results from a fetal inflammation involving the papillae without resulting in obliteration. He says that the papillary atresia cannot be attributed to a congenital narrowing, because certain embryologic investigations have shown that the tubules are developed from the wolffian ducts and do not develop separately from them and afterward unite with them. The fact that we find cysts in all parts of the kidney, including the papillae, does not, however, make it necessary to assume that the obstruction must be located in the papillae. The cysts of the upper tubules might extend into the papillary tract and displace the straight tubules and project into the pelvis.

In favor of the theory that the condition is a developmental malformation is the fact that other congenital malformations frequently coexist. The presence of congenital cystic liver in association with cystic kidney, which occurs in 19 per cent. of the cases (Moscowitz), is also significant of the embryonal origin of the condition. The cysts of the liver are ascribed by Moscowitz as due to the obstruction of afferent intra-acinar bile-ducts, and are evidence also of congenital origin. Other anomalies which have been found associated with cystic kidney are hypospadias, atresia, and absence of ureter, vagina, bladder, etc.; also hare-lip, spina bifida, or absence of extremities. There is now pretty general agreement among investigators that the condition is due to defect in development, which is explained somewhat as follows: The tubular structure of the kidney, including the glomeruli, the convoluted tubules, the loops of Henle and the straight tubules, to a considerable extent, originate by a development of tubules in the mesoderm of the embryo. The ureter, kidney, pelvis and an uncertain amount of the straight tubules in the pyramids develop from a tubular process which originates from the wolffian duct. The straight tubules grow out and meet the primitive vesicle, which becomes the glomerulus; and then later from this glomerulus the convoluted tubules and Henle's loops are developed (Brödel). In case this tubule growing from the wolffian duct fails to connect with the primitive glomerular vesicle, an obstruction occurs, resulting in cystic dilatation of the entire tubular system above the straight tubules. The extent of the process will depend on the relative number of tubules that fail to meet. If a large proportion fail to connect, then the cystic formation will be rapid and complete, and, no kidney tissue being left to eliminate urine, the patient will die. If, on the other hand, there be left comparatively large areas of healthy kidney tissue, enough for the elimination of uric acid, the patient may live for years and die from other causes. The presence of the increasing cystic tissue may finally so squeeze the intervening healthy tissue as to cause insufficiency, and the patient dies from this. This theory seems adequate to explain the facts as observed, and to be in every way more probable than that fetal nephritis involves the papillae. This view has lately been adopted by Berner.[1]

Bunting, in a careful microscopic study of specimens from two cases, found that in these cases the urinary path could be opened from the glomeruli through to the pelvis of the kidney, and, therefore, added no evidence in support of the obstruction theory or a failure of two sets of tubules to join with each other. He believes that the primary cause of the trouble is the epithelial hyperplasia, which, so to speak, forces out the walls of the tubules. This theory does not satisfactorily explain, however, why we get cystic forms instead of epithelial growths, and needs further confirmation. Whatever theory of cystic kidney be adopted, we cannot help concluding that it is

1. Berner, O.: Zur Zystennierenfrage, Virchows Arch. f. path. Anat., 1913, cclxv, 265.

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a developmental condition, a malformation rather than a new growth. A fact that speaks strongly for the malformation origin is its occasional occurrence in several generations of the same family, showing a tendency to inheritance.

Cystic kidney has oftenest been observed in the middle decades of life, but cases have been reported in the first and second decades as well. In the adult, the pathology corresponds in every way with that of the new-born except that the individual cysts are larger, as are also the entire kidneys. It becomes evident, therefore, that if our explanation is correct, we must assume that in case of cystic kidney in the adult, the condition has existed since birth but has not until later years given rise to symptoms that attract attention.

If our views of the etiology and pathology of the disease as given above are correct, they will furnish us an adequate explanation of the somewhat remarkable symptomatology and course of the disease. The most thorough and careful description of the course and symptoms which I have found is that of Milward of Birmingham, who divides the clinical history of the disease into three stages:

1. The stage of progressive enlargement of one or both kidneys without subjective symptoms. The renal enlargement is discovered, if at all, by accident. This stage may last from a few months to several years.

2. The stage of subjective symptoms and objective signs. This stage lasts from a few months to six or eight years, or even longer. The signs and symptoms are dependent on the size and weight of the tumors.

3. The stage of decreasing elimination of urine. In this stage appear the symptoms of uremia or cerebral complications. It lasts two or three weeks or a few months.

Males and females are affected in about equal numbers. The disease usually terminates fatally in the fourth, fifth, or sixth decade. Renal enlargement is rarely discovered before adolescence, and when the disease develops in infancy, the child hardly ever lives till the tenth year, so that the disease has been rarely reported between the tenth and thirtieth years.

The symptoms noted during the second stage are a dull, aching pain in the region of the kidneys, during both night and day, but usually worse in the daytime, especially if the kidney is movable. A large part of the pain, especially in the later stages, seems to be due to mobility of the kidney. There is tenderness on palpation or pressure, and occasionally the pain may be paroxysmal and very severe, with resulting prostration. Since many of the kidneys removed at operation or examined post mortem present cysts filled with blood under high pressure, it is reasonable to suppose that some of the pain may be due to hemorrhage into the cysts. Occasionally, suppuration has taken place in one or more of the cysts and has required operation. Flatulence, headache, dyspepsia, vomiting, anorexia and constipation are frequently concomitant symptoms. It is an important and somewhat interesting fact that the examination of the urine often throws very little light on the diagnosis, a circumstance which contributes greatly to the difficulty of the latter.

During the second stage and until the deformation is far advanced, the kidneys are capable of continuing their functions almost perfectly. The specific gravity is usually low, below 1.010, and the amount passed is usually slightly increased, but may be diminished. There is usually only a slight trace of albumin, and often albumin is entirely absent. In the second stage, it is never present in large quantities except when there is a great deal of blood. Casts are practically always present; leukocytes are common and often occur in large numbers. Pus may be present in acid urine. Blood is usually present in traces, and when there is hemorrhage into the cysts, may be poured out in such large quantities as to constitute attacks of hematuria. Bleeding may occur every few months, or once a year, or may never be sufficient to tinge the urine. Some blood, however, is always present, and this is significant (Milward).

The elimination of urea may amount to from 250 to 350 grains until late in the second stage; and it is not unusual when death occurs suddenly (as it often does in the third stage) for the physician to find to his surprise the cystic kidneys.

The symptoms of the third stage are those of uremia or some allied complication, such as cerebral hemorrhage, due to arteriosclerosis, and consist of headache, dyspnea, drowsiness, convulsions, paralysis and coma.

In the majority of cases the symptoms last from a few months to five or six years. Twenty-two and nineteen years, respectively, was the duration of symptoms in the longest cases noted. Ritchie, reporting on eighty-eight cases, found that in seventy-five, the average age at death was 45.3.

Of seventy-eight cases in which the symptoms were analyzed, thirty had renal symptoms apart from albuminuria, twenty having pains in the loins and abdomen. Sixteen had hematuria at some time. Seven had no kidney trouble, and no evidence of illness, but cystic kidneys were found post mortem. Eleven suffered, or had suffered, from edema; in ten the absence of edema was stated. In thirty-three the urine contained albumin, in nineteen a trace, and in eleven a considerable quantity. Vomiting or intestinal symptoms, constipation or diarrhea, was present in nineteen cases. Twenty showed anemia, cachexia or loss of flesh. Thirteen had dyspnea or some pulmonary affection. In twenty-one, tumor was discovered during life in one or both flanks.

A brief review of the literature shows us that those patients who have come under the surgeon's care presented themselves during the second stage for pain in the side, due either to the weight or to the mobility of the tumor. The surgeon finding the tumor operated, and, if it was large and malignant-looking, not infrequently removed it. The patient lived or died according to the presence or absence in the other kidney of sufficient healthy tissue to attend to the elimination of urea.

Several years ago, in cutting down in a case[2] of movable kidney, I found that I had a case of congenital cystic kidney to treat. I made an incision on the other kidney, and found that also was cystic, so, instead of removing the kidney in this case, I punctured the larger cyst, and sutured the kidney in place, with considerable relief of the symptoms, so that the patient (who was a nurse) was able to go back to work and lived in comparative comfort for many years.

My next experience (Case 4, reported below) was being called to see a woman who was subject to congenital cystic kidney, who had recently had a baby, and following that, had had infection of one of her

2. Lund, F. B.: Congenital Cystic Kidney, THE JOURNAL A. M. A., Aug. 18, 1906, p. 479.

kidneys. This had been incised, and from the wound pus was discharging, and she had had a picket-fence temperature for something like six weeks. I cut down on the kidney, and found a congenital cystic kidney, with many of the cysts infected. Inasmuch as she was rapidly running down from suppuration and there was no way of draining all the separate cysts, I removed the kidney, hoping that the other kidney was not too much involved in the disease. She recovered from the operation and got well. When she became pregnant again, symptoms of swelling of the extremities, dizziness, headache, etc., appeared, and she had to have miscarriage induced twice. Then I removed the tubes, and she has been well and happy since—about five years. The other kidney—the right one—can be felt to be considerably enlarged and cystic at the present time, but it is not increasing much in size.

These experiences led me to make a study of congenital cystic kidney, the results of which were published in a paper read before the American Medical Association at its Boston meeting in 1906, from which I have freely quoted.

It is evident from the foregoing discussion that the disease is fatal from compression of the kidney-tissue between the cysts; and that while it may be practically impossible to cure the disease, it might be arrested at any given point if the growth and multiplication of the cysts could be stopped so that the kidney-tissue could be no further compressed between them. This Curtis and Kammerer have attempted to do, and I myself have done it rather inefficiently without knowing of their work, as in the case I referred to at the beginning of this paper. Last year, however, I had the pleasure of a visit from Professor Rovsing, who told me of his results in the treatment of this disease by puncture of the cysts; and under his direction, I was fortunate enough to be able to perform an operation on the right kidney of a patient then in the ward. I have since had the opportunity of the same patient, and on one kidney in each of two other patients, and I am so pleased with the results that I am glad of the opportunity of reporting them.

Rovsing's operation consists in exposing the kidney through the ordinary oblique incision in the loin, and puncturing the cysts on its surface as far as they can be reached by retracting the wound; and it will be found when you try it, that a very large area of the anterior and posterior surface and posterior border of the kidney can be reached. As the cysts are punctured and the contents flow out, the kidney is much diminished in size, and may be so reduced that one pole and then the other may be delivered from the wound. Then, with the kidney held in the left hand, the larger cysts and bunches of cysts may be felt and the hollow needle run into them. Care should be taken to avoid the areas of normal kidney-tissue wherever they can be seen and felt. There will be very little bleeding unless these areas of tissue are punctured. A kidney which is six, or eight, or even ten times the normal size may by this means be reduced until it is of a very decent size, say perhaps twice the size of a normal kidney. Then the kidney can be replaced in the abdomen, and the wound closed without drainage. It seems like a formidable procedure, but it is not so; and the surprising thing about it is, that the kidney not only is of smaller size when it is replaced in the abdomen, but that after a temporary increase in size, it remains small and no longer troubles the patient by its weight and dragging sensations.

Rovsing[3] has reported three cases in which this operation was performed. In his first case, reduction in the size of the kidney was permanent, and the albuminuria which was noted before the operation disappeared. The patient lived in comfort for some time, and then died of uremia following fever. In Rovsing's second case, the pain and dragging from an enormous kidney was relieved by this operation, and the patient was well for two and one-half years after the operation. The albuminuria diminished, the urinary excretion tripled, and the urea excretion doubled.

In Rovsing's third case, an enormous kidney was reduced in size, the twenty-four-hour quantity of urine increased, the excretion of urea increased, the patient's appetite improved, and the patient's color became healthy. Rovsing says:

> It is to be noted that in these cases, the pain disappeared and renal fuction was reestablished to a striking degree. . . . There is but one explanation for this unmistakable improvement in the activity of the kidneys. Normal renal tissue is present among the cysts. The pressure of the latter when full and tense inhibits renal function, which is resumed when the mechanical effects of pressure are removed. The improvement of the patient is also thus accounted for. It is not claimed that the disease is cured by the operation, or that its ultimate fatal issue is more than just postponed. The disappearance of the pain, however, the prolonged and striking restoration of renal activity, the simplicity of procedure and the absence of shock after the operation should constitute a sufficient incentive to attempt this treatment as herein outlined in every case of this type.

My own cases go far to bear out the statements of Rovsing in regard to his operation. I will give them as follows:

Case 1.—M. M., negress, aged 37, married, who had had eight children and five miscarriages, was admitted to the Boston City Hospital in June, 1910. In May, 1912, lumps were found on both sides, which were diagnosed by her physician as kidney tumor. Appetite was good; bowels constipated; no urinary symptoms. The patient had noticed the lumps for three years. She appeared to be well developed and nourished. Heart, lungs and extremities were negative. There was marked enlargement of both kidneys. Function of left kidney was not good, and operation was advised to relieve pressure.

Cystoscopic examination (Dr. Binney) revealed bladder normal and ureters normal; catheterized for 15 cm.

Functional test: Phenolsulphonephthalein: Color appeared from right ureter at end of 25 minutes; from left, ?

Right, first hour, 0; second hour.....	5 per cent.
Left, first hour, 0; second hour.....	0 per cent.
Bladder urine	18 per cent.
Total	23 per cent.

No function of left kidney; very low normal function in right.

June 24, 1912, I made a left lumbar incision. Kidney was exposed and found enlarged to the size of a baby's head, and to consist of cysts. No kidney tissue was found. The cysts were punctured, with discharge of straw-colored fluid until the kidney was small enough to deliver through incision. I continued to puncture the cysts, both deep and superficial, until the kidney was reduced to twice normal size. It was then replaced, and the abdomen sewed up tight. The patient made a good recovery, but tests made about two weeks after the operation showed no apparent change in the kidney function since the operation. The patient was discharged, July 11, after being told to come back in September for an operation on the other kidney.

3. Rovsing, Thorkild: The Treatment of Multilocular Kidney Cystoma (Congenital Cystic Kidney) by Means of Multiple Punctures, Am. Jour. Urol., 1912, viii, 120.

The urine examination, July 10, follows:

Pale; cloudy; specific gravity, 1.004; acid; slight trace of albumin; no sugar; much pus; few epithelial cells.

The patient returned to the hospital, April 16, 1913. She stated that after leaving the hospital, last July, she felt weak. Complained of pain "across the small of the back" when bending over or when fatigued. Has slept well; good appetite; no nocturia; no trouble in passing water; has cramp-like pains in left side of neck, left arm, left shoulder, and in left leg; menses regular; no leukorrhea; constipated. During the previous month, the patient had felt considerably weaker, and complained of headache and languor.

On physical examination, the patient presented in right upper quadrant an irregular mass extending to middle line and to level of umbilicus, and above to costal border. The mass could easily be seen with patient at ease, moving with respiration. On palpation with one hand on abdomen over mass and other hand in flank, the mass could be moved about freely, with no apparent pain.

April 17, I made a loin incision. The kidney was found much too big to be delivered through the wound. No good kidney-tissue could be seen; nothing but honeycomb cysts of all sizes could be seen or felt in the kidney. I punctured the cysts with a trocar, and much clear and cloudy fluid (not urine) was withdrawn. After a considerable number of cysts had been punctured and contents evacuated, the kidney was delivered and puncturing of the cysts continued. After reducing the kidney greatly in size, I put it back in position, and closed the wound. Eight days after the operation, the patient was comfortable and passing considerable urine. The mass could be felt, but it was considerably smaller than at entrance, and the patient was discharged May 1.

I saw this patient in the autumn of 1913. She was in good condition, and both kidneys could be felt, but they were not nearly so large as before operation.

CASE 2.—F. S., a woman, aged 35, married, two children, had had a hard time with the first child, and was miserable for five or six years; suffered from anemia; had pain in right side; seemed as if stomach was floating.

Examination showed a very large mass in the right loin extending down on to the brim of the pelvis. The left kidney could also be felt. The mass in the right loin felt as if cystic. Probable diagnosis was made of congenital cystic kidney, and Dr. Loder examined the urine from both kidneys and reported as follows:

Bladder Urine: Very pale. Specific gravity, 1.005. No albumin. No sugar. Neutral. Urea, 0.2 per cent.

Right Urine: Specific gravity, 1.005. Trace of albumin. Urea, 0.2 per cent. Sediment: Blood and epithelium from catheterization. No pus. No casts or renal cells.

Left Urine: Specific gravity, 1.005. Trace of albumin. Urea, 0.3 per cent. Sediment: Blood and epithelium from catherization. No pus. No casts or renal cells.

Functional Test:

Right: Time, 9 minutes. 84 c.c.	22 per cent.
Left: Time 11 minutes. 65 c.c.	22 per cent.
Leakage about catheters	8 per cent.
Total	52 per cent. (1 hour)

Cystoscopy: Trigon shows numerous small, slightly congested areas, slightly elevated. Right ureteral orifice, negative. Left orifice is encroached on on one lip by one of the above-mentioned minute elevations; otherwise normal in size and motion. Catheters passed without difficulty to kidney.

Conclusion: No infection or tumor of kidney. No impairment of function of left kidney.

At the Deaconess Hospital, Aug. 29, 1912, she was placed in a left lateral position for operation on the right kidney. Then the tumor could not be pressed up into position of the kidney, and some doubt was felt as to the diagnosis. An abdominal incision was therefore made at the outer border of the right rectus for exploratory purposes. The left kidney was found to contain numerous large cysts, and the right kidney numerous cysts of various sizes, and a very large cyst at its lower pole. The patient was replaced in the lateral position, and an incision made from the tip of the twelfth rib down and forward to the spine of the ilium. The kidney was dissected out and drawn out of the loin. A very large cyst, which must have contained 4 ounces at the lower pole, was opened and cut away. The other cysts all through the kidney were punctured with a trocar and opened with a knife. There was a good deal of healthy kidney tissue between the cysts. The kidney was reduced to about one-third of its former size, and was sutured to the spinal muscles. In puncturing the cysts, the pelvis of the kidney was opened with a knife, and this opening was closed by suture. A cigaret drain was passed into the loin and the wound sutured to it.

The patient had a high temperature for four or five days, and on September 5 I found pus in the lower angle of the wound. I opened it up, and found a cavity containing about 2 ounces opposite the lower pole of the kidney.

After operation, there was a large increase in the amount of urine passed. The patient made a good recovery, and during the winter and spring of 1912-1913 she gained in flesh, color, and general appearance. Oct. 15, 1912, Dr. Loder made a phenolsulphonephthalein test, as follows:

Right: Time, 9 minutes. 35 c.c.	24% Urea, 0.4%
Left: Time, 9 minutes. 40 c.c.	22% Urea, 0.3%
Leakage	10%
Total	56%

This test as compared with that before the operation shows a doubling of the amount of urea in the excretion of the right kidney.

I saw this patient in June, 1914—that is, nearly two years after the operation—and she is in excellent health. She has good color, and looks much better than when she was operated on. The right kidney (the one operated on) could just barely be felt. The left kidney could also be felt and is a little enlarged.

The urine examination, June 15, 1914, was:

Slightly cloudy; acid. Specific gravity, 1.010. No sugar. Slightest possible trace of albumin. Sediment: Few small round renal cells. No pus, blood or casts.

CASE 3.—C. S., woman, aged 41. One child, instrumental delivery twenty years ago. For about a year, had been growing thin and weak; complexion had become sallow; and she had suffered considerable abdominal pain, especially in the flanks. She had consulted her physician, Dr. C. H. Miller, merely for debility. He had discovered tumors in both flanks, and sent her to me.

On examination, I found her thin and pale. There was very marked enlargement of both kidneys, especially of the left.

Urinary examination by Dr. I. J. Walker, was as follows: Specimen from bladder: Cloudy. Specific gravity, 1.014. Acid reaction. No sugar. No bile. Slight trace of albumin. Sediment: Some blood; some small and large renal cells; a few bladder-cells; a few leukocytes; no casts.

Cystoscopic examination was as follows: Bladder walls normal in appearance. Right and left ureteral orifices normal in appearance. Ureters catheterized and specimen obtained from each kidney. Flow from right kidney about five times greater in amount than that from left kidney.

Specimens showed the following:

Right: Pale. Slight trace of albumin. Sediment: Many small round renal cells, and a few large round renal cells. Rare normal blood corpuscle. Few hyaline casts in about twenty fields.

Left: Much normal blood. Many small round renal cells, and a few large round renal cells. A few leukocytes. One hyaline cast found.

Functional test: Color appeared from right kidney in twelve minutes; from left, in seventeen minutes. Urine collected in one hour showed: right kidney, 20 per cent.; left kidney, 2 per cent.

Rovsing's operation was done at the Boothby Hospital, March 29, 1913: Oblique left lumbar incision. Enormous polycystic kidney found. A very thorough puncture of the kidney was done with a moderate-sized

aspirating needle, running it thoroughly all through the kidney wherever a cyst could be found. The cysts on the surface appeared to extend out into the surrounding connective tissue. By puncturing the cysts, marked diminution in the size of the kidney was made, and it was finally drawn outside the abdomen. When I finished, the kidney was about twice normal size, and about one-fourth the size it was when we started to operate. In puncturing the cyst in the upper pole, a moderate amount of blood was obtained. Having punctured all the cysts we conveniently could, the kidney was replaced and sutured with chromic catgut sutures. A cigaret drain was placed in the lower angle of the wound. The patient bore the operation well.

Before the operation, the patient was passing from 30 to 45 ounces of urine; the following is the report of the urine examination made two days after the operation: Cloudy. Acid reaction. Specific gravity, 1.008. No sugar. No bile. Slight trace of albumin. Sediment: Some normal blood (about 60 corpuscles to a field), a few small round renal cells; occasional large round renal cells; a few bladder cells; rare ureteral cells; much amorphous urates.

The amount of the urine increased; the kidney increased somewhat in size and afterward diminished, and has since remained so it can hardly be felt to have increased in size. The patient has made a considerable gain in flesh, strength, and general appearance. No urethral catheterization has been done since the operation.

I saw this patient in June, 1914, a year and three months after the operation. The left kidney (the one operated on) could just barely be felt. The right is certainly as large as the left was before operation. Her face has filled out, and she feels much better. She is going to come in the autumn to have the other kidney operated on.

Examination of the urine, June 15, 1914: Slightly cloudy. Acid. Specific gravity, 1.006. No sugar. Slight trace of albumin. Sediment: Many bladder-cells. Considerable number of leukocytes. Few small round renal cells. No blood or casts.

Case 4.—C. J., a young married woman, seen in consultation with Dr. Bateman at the Somerville Hospital, in 1907. Her father had died at the age of 50 with cystic kidneys. She had been trained as a nurse, and had recently married. Four months before, she had had a baby, which was born in normal fashion. After the baby's birth, the patient had had a high temperature and complained of pain in the right side. Three weeks before, a surgeon had been sent for, who found a tumor in the region of the left kidney, made an incision, and found several cysts, some of which contained pus. After the operation, the patient had a temperature from 100 to 103, and suffered pain, although she passed a fairly normal amount of urine.

I found a discharging sinus in the left side, and a large tender kidney on that side. The right kidney was also palpably enlarged. June 29, through the sinus, I found a large kidney studded with cysts of various sizes and colors, some of them containing pus. It had been recognized that suppuration from that kidney was the cause of her symptoms, and that it was therefore necessary to remove the kidney. This was done, the pedicle being sewed with catgut. Considerable pus escaped from several cysts. Her pulse was about 140 during operation. July 2, she was reported in good condition.

I saw the patient again, two years after the operation just reported. In the meantime, she had had to have two abortions done by Dr. Bateman, as she had become pregnant and the condition of her kidneys would not allow her to go through pregnancy. She had recently become nervous and suffered a good deal of pain in the left side of the pelvis. Examination showed the uterus movable. The left ovary could be felt to be prolapsed, and this was thought to cause her pain. Median laparotomy was done. The prolapsed left ovary and tube were removed, and the right tube was removed, the right ovary being left behind. This was done to prevent future pregnancy. The right kidney could be felt very much enlarged and cystic. The patient made a good recovery.

As a result of my experience in these four cases, although it is not a large one, I am inclined to think that Rovsing's suggestion of a thorough, systematic puncturing of all the cysts until the kidney is brought down to near normal size is a distinct advantage to our therapeusis in these cases; and I am inclined to feel that I shall perform it in all cases in which the kidney secretion is not too greatly crippled so that any operation might bring on uremia. I believe that in the present state of our knowledge, it is wise, in case both kidneys are involved, to operate on only one kidney at a time. Even if we cannot absolutely cure our patients and make them as good as if they had never been subject to the disease, if we can relieve them of pain and dragging, as I think it has been demonstrated that we can, improve their health, weight, appearance and color, and practically arrest the disease, it seems to me that we can accomplish a good deal. And we must give to Rovsing the credit for having improved and systematized the method of puncture of the cysts—which had been tried in a half-hearted way by others, including myself—until it has a really distinct therapeutic value.[4]

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ABSTRACT OF DISCUSSION

Dr. D. N. Eisendrath, Chicago: Dr. Lund's paper is an example of what modern pathology has taught us. Formerly we thought that a congenital cystic kidney was only of interest to the pathologist, but now that we have come to see it under various clinical forms, it becomes of great interest to the surgeon. These cases, formerly regarded as absolutely hopeless, are now amenable to such an operation as Rovsing's for at least temporary relief and the prolongation of the patient's life for a number of years. I differ with Lund only with regard to the priority of this operation. Dr. Witherspoon of Butte, Mont., at our meeting at St. Louis first presented this operation in this country. I think Dr. Witherspoon deserves equal credit with Rovsing for this, having worked independently of him. The clinical picture is one every general practitioner as well as the surgeon should know. Many cases show first of all marked symptoms of uremia. In a case of uremia think of the possibility of a congenital cystic kidney as a basis and examine the abdomen. In a comparatively early period you will find a kidney which you can recognize as of the congenital cystic variety; the kidney is lower and easily palpated for that reason. It has a lobulated, soft surface. I made the diagnosis in one case three years ago, first in one kidney and then watched

4. In addition to the references already given, the following will be found of interest:

Albarran, J., and Imbert, L.: Les tumeurs du rein, Paris, 1903.
Anglada, Jean: Etude anatomo-pathologique et classification pathogénique d'un cas de reins polykstiques bilateraux, Jour. d'urol. med. et chir., Feb. 15, 1913, p. 139.
Bevée, J. Wesley: Bilateral Polycystic Degeneration of the Kidneys, South. Med. Jour., March, 1909, p. 376.
Rischbieth, H., and DeCrespigny, C. P. C.: Polycystic Disease of Kidneys: Remarkable Persistence of Functions in Two Cases of Adults, Lancet, London, Feb. 15, 1913, p. 450.
Garceau, Edgar: Renal, Ureteral, Perirenal and Adrenal Tumors and Actinomycosis and Echinococcus of the Kidney, New York, D. Appleton & Co., Feb. 15, 1909.
Lipskeroff, A.: Ein Fall von solitärer Zyste der Niere, Folia urol., vi, 1911-1912.
Rovsing, Thorkild: Die Krankheiten der Harnorgane, Lehrbuch der Chirurgie, 1909, ii, part 2, p. 241.
Steiner, P.: Ueber polycystische Nierentumoren, Folia Urol., 1912, vi, 542.
Vogel, Robert: Beiträge zur Nierenchirurgie; 2 Fälle von Nierencyste, Zentralbl. f. Chir., Nov. 9, 1912, p. 1540.
Rosenow, Georg: Polyzystisches Nierenrudiment bei Fohlen des Ureters und Vas deferens, appendikulärer Schwellkörper des Penis und zahlreiche andere Missbildungen bei einem 8 monatlichen Fötus. Zugleich ein Beitrag zur Entwicklungsgeschichte der menschlichen Niere, Virchows Arch. f. path. Anat., 1911, ccv, 318.
Torrance, Gaston: Nephrectomy for Polycystic Condition of the Kidney, Am. Jour. Obst., April, 1913, p. 736.

the development of the condition in the opposite kidney. The same condition confronted us in that as in one of Dr. Lund's cases, namely, pregnancy. It was necessary to interrupt pregnancy on account of the threatened uremia which would have undoubtedly ensued. The second clinical symptom of this kidney condition is hematuria; a fair proportion of cases of severe bleeding from the kidneys is probably due to such a condition. In every case, congenital cystic kidney appears as a tumor. A large, soft, lobulated tumor of the kidney accompanied with hematuria should be considered among other causes, as due to this condition. It has been supposed to be useless to operate in these cases because they are bilateral, but as Dr. Lund has pointed out, the benefit from such operations is so great that we ought not to abandon them. At a recent meeting of the American Urological Association Dr. Barnett of Fort Wayne reported one case of his own and quoted, among others, four cases of Dr. Ochsner, in which they removed such a kidney, thinking that the condition was unilateral. This condition is always bilateral and if one kidney is ahead of the other in the development of the condition the other will surely catch up with it, and it is perfectly useless to take out one kidney. The condition is due to lack of union of the proximal and distal portions of the urinary tract.

DR. A. L. CHUTE, Boston: In such experience as I have had the condition has invariably been bilateral. In Walker's new book on this subject he gives some figures concerning the relative frequency of unilateral and bilateral polycystic kidneys. He says that in only one case in thirty is the disease confined to one side. This too small a proportion to allow one to consider nephrectomy in these cases. The last case that I saw illustrates the other point—that of the infection of these kidneys. This patient, a woman of 47, had a history of some renal trouble six years before. This was supposed to be Bright's disease and she improved considerably under treatment. The latter part of last December she had an attack of pain, first in the right side, then in the left. She had a moderately elevated temperature with these attacks. I easily could feel a mass in her left side. I thought this was due to hematogenous infection and that it would quiet down without any interference. The temperature kept up and I operated on this kidney and found two pockets of pus which I thought were abscesses in the cortex, and which I opened. After the operation, the temperature kept up and the patient became apparently uremic and died four days later. Necropsy showed that there were several other infected cysts in the kidney I had operated on, and that the other kidney was also polycystic and contained likewise a number of suppurating cysts. The question has been raised as to the advisability of removing these kidneys when they have become infected.

DR. ARTHUR DEAN BEVAN, Chicago: I have had six or eight of these cases under observation. The first point I make is that this condition is not always bilateral, or if it is the condition varies so on the two sides that nephrectomy is not entirely eliminated from consideration. I think it is, in the majority of cases, but I have had two cases in which we made a nephrectomy for polycystic kidney with practically permanent results. The first case was one in which, a number of years ago, a patient came to me complaining of severe hemorrhage from the kidney. The hemorrhage was extreme. The man was very anemic. It was before the days of the phenolsulphonephthalein test and at the time we were using cryoscopy. The cryoscopic examination of the blood, not of the urine, showed a fairly normal condition and with that as a guide I did not hesitate to remove an enormous polycystic kidney on the right side from which the blood came. The man made an uneventful recovery and years later I saw him and he was perfectly well. Another case some time later, in a woman, was much the same condition, with recovery, so that, although in the great majority of these cases the condition is bilateral, there is a certain number in which it is unilateral, and a nephrectomy is not entirely excluded. In a number of cases in which I have found extensive polycystic conditions in both kidneys at the time of the exploratory operation, I have been surprised to find, when a purely exploratory operation has been made, that the patients have recovered and have lived for years. The condition slowly progresses and the finding of this polycystic degeneration does not mean anything like an immediate menace to the patient's life. I believe that the work done by Rovsing and Dr. Lund shows a definite and distinct advance. I have not employed this operative procedure, but in the next case of polycystic degeneration of the kidney with which I have to deal I shall certainly employ the Rovsing-Lund procedure. I believe it is perfectly rational and a common-sense proposition and that it does hold out definite benefit to the patient.

DR. ALBERT J. OCHSNER, Chicago: I wish to bring out two practical points. In this class of cases the patient's condition will be enormously improved by a proper diet. A patient who was a perfectly useless suffering invalid has been able to teach school the entire year with perfect comfort by simply confining herself to the food that one would provide for any patient who has not enough active kidney tissue to do the physiologic work; namely, milk, buttermilk, cooked vegetables, fruits and fruit juices. In the place of meat these patients should eat from two to six eggs each day. By adhering to this diet one will be amazed at the improvement in the condition. Three twenty-minute roentgenizations will produce sterility. Why should the tubes and ovaries be removed in a case in which sterility can be obtained in this safe and simple manner? I have a patient at present under this treatment. This, of course, applies to every female in whom, to prevent uremia, sterility must be secured. In order to make absolutely sure I gave this patient six exposures directly over the ovaries on successive days and feel perfectly certain that pregnancy cannot occur.

DR. F. W. MCRAE, Atlanta, Ga.: I operated in one case of congenital kidney which was certainly unilateral. I came on the kidney accidentally in doing an operation for acute appendicitis on a patient in September, a year ago. The patient was brought in in a rather extreme condition and in making a transverse incision in removing the appendix I found a large cystic tumor. I was not familiar with Dr. Rovsing's work, though I knew of Dr. Lund's. I felt it was safer to make another incision and drain the kidney. The exploration enabled me to examine the opposite kidney and it seemed perfectly normal. The drainage lasted over three months and during that time I had one of our best genito-urinary men make cystoscopic examinations and try to find communication between the kidney and bladder above and below. There seemed to be no connection. In January I removed the kidney. The boy was 14 years old and since that time has increased in weight from about 70 to 110 pounds and is in perfect health. The cyst after draining became infected with a pyocyaneus infection, and the boy's condition became bad, so that it was absolutely necessary to remove the kidney, which the father hesitated to have done. This case proved beyond question that some of these patients may be operated on and permanently cured.

DR. F. B. LUND, Boston: I would not deny the existence of unilateral congenital kidney cyst, but in all necropsies that I have seen they have been bilateral. So large a proportion are bilateral that we should not think of nephrectomy without inspection to ascertain whether the other kidney is normal. Nephrectomy should be done unless there is sufficient kidney function in the diseased kidney to make it worth saving, in which case Rovsing's operation could be done on the diseased kidney, even if the other kidney is healthy. With regard to the use of Roentgen rays for producing sterility, I did not take out the ovaries to produce it; I tied off the tubes and removed one of the ovarics because it was somewhat cystic.

The Source of Dogmatism.—Gross ignorance produces a dogmatic spirit. He who knows nothing thinks that he can teach others what he has himself just been learning.—La Bruyère.

FURTHER STUDIES OF THE THOMPSON-McFADDEN PELLAGRA COMMISSION

A SUMMARY OF THE SECOND PROGRESS REPORT *

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The First Progress Report of the Thompson-McFadden Pellagra Commission was published in successive numbers of the *American Journal of the Medical Sciences* from April to September in 1913, and a summary of this material appeared in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, Jan. 3, 1914. The chief conclusions from the first year's work were stated as follows:

1. The supposition that the ingestion of good or spoiled maize is the essential cause of pellagra is not supported by our study.
2. Pellagra is in all probability a specific infectious disease communicable from person to person by means at present unknown.
3. We have discovered no evidence incriminating flies of the genus *Simulium* in the causation of pellagra, except their universal distribution throughout the area studied. If it is distributed by a blood-sucking insect, *Stomoxys calcitrans* would appear to be the most probable carrier.
4. We are inclined to regard intimate association in the household and the contamination of food with the excretions of pellagrins as possible modes of distribution of the disease.
5. No specific cause of pellagra has been recognized.

It was decided that our efforts during the second year should be devoted especially to a continuation of the field study of pellagra to see whether a further and more intensive investigation of the occurrence and distribution of the disease would yield further evidence confirming our ideas of its infectious nature and additional data indicating the particular manner of its transmission from person to person. The field work of the first year had laid a good foundation for further and more detailed observations in the same territory during the second year. At the same time, however, the attempts to transmit pellagra to animals, the studies of the blood and of the intestinal micro-organisms, and the observations on treatment of pellagra were continued. The detailed accounts of certain portions of this work are to appear in early numbers of the *Archives of Internal Medicine*, and some phases of the work are illustrated in an exhibit displayed at the present session of the American Medical Association.

At the end of 1912 we were able to present records of 282 cases of pellagra in Spartanburg County. In 1913 this number was increased to 847 cases which had occurred in the county and concerning which we have recorded more or less detailed information.

The geographical distribution of pellagra in Spartanburg County has continued to be very uneven, the large active foci of the disease being in and near the large centers of population and especially in the industrial communities surrounding the cotton mills. The agricultural population seemed to be, on the whole, much less affected by the disease. In 780 of these cases we know the race of the patient and the place in which he lived at the time the disease was recognized; 680 of them were white and 100 negroes, a morbidity rate of 119 per ten thousand among the whites and 38 per ten thousand in the negroes. This ratio of 3:1 is not considered to be necessarily indicative of a relative racial resistance to pellagra in negroes, but rather as the end-result of the influence of several factors. In Spartanburg County about one-fourth of the entire population resides in cotton-mill villages, and it is in these communities, made up almost entirely of white persons, that pellagra is most prevalent. The congestion of population in these communities in conjunction with the poor hygienic conditions under which the people live, as compared with the relative isolation of the bulk of the colored population on farms, appears to us to be an important factor governing racial distribution in Spartanburg County.

The age and sex was ascertained for 740 of the pellagrins, 528 being females and 212 males. The distribution according to sex and age at time of record showed much the same features as were noted in 1912. There was no case under the age of one year and only one, a negro baby, in the second year.[1] In the third year there were 12 cases and between the ages of 2 and 10 years no less than 94 cases, nearly equally divided between boys and girls. Among females, those between 12 and 17 years of age were relatively least frequently affected by pellagra, the age period under 2 years being excepted. In females beyond the age of 17 the pellagra morbidity rose abruptly so that the number of recorded cases in the age period from 20 to 44 equals about 2.5 per cent. of the women now present in the county in that age period, a ratio much higher than was observed in any other group of the population. Women beyond 44 years of age were somewhat less frequently affected by pellagra. In males the number of cases was large from the third to the eighth year, then somewhat less until the lowest morbidity was reached at puberty and maintained from the fourteenth to the twenty-first year, after which there was a gradual increase to old age, the rate after 50 being approximately equal to the rate for females of the same age.

The remarkable features of the data seem to be the almost complete absence of pellagra under the age of 2, its very slight prevalence for the five years following puberty in both sexes, and its slight prevalence in adult males under 50 years of age; further its enormous prevalence in adult females, somewhat less marked prevalence in children of both sexes from 2 to 10 years of age and the almost equally marked prevalence in old age in both sexes. These features of the age and sex distribution we believe to be due in part to differences in individual resistance to pellagra and in part to differences in exposure to the disease, especially by association with other pellagrins.

The data in regard to occupation are available for 726 pellagrins, of whom 413 lived in cotton-mill villages and 313 lived elsewhere. Of those not living in cotton-mill villages (313), more than half, actually 171, were women engaged in housework exclusively; there were 25 children without occupa-

* From the New York Post-Graduate Medical School and Hospital.
* Read before the joint meeting of the Section on Preventive Medicine and the Section on Pharmacology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, June, 1914.

1. We have seen a few definite cases of pellagra in very young children outside of Spartanburg County, one patient from Laurens, S. C., 1½ years old, and one at Clinton, S. C., 13 months of age. We have records of the cases of several other patients less than 2 years old which have been reported to us by reliable observers.

tion; 37 farmers; and the remaining 60 pellagrins represented 19 different occupations, among them 5 merchants, 3 machinists, 1 college student, 1 butcher, 1 postmaster, 1 railroad fireman and 1 printer. Of the 413 pellagrins in mill villages, 133 were women engaged exclusively in housework; 96 were children without occupation; and 110 were women working part or all of the time in the cotton mills. The 71 adult males were practically all mill hands. The remarkable feature of the occupational study seems to be the lack of definite connection between occupation and pellagra. Although the disease was most prevalent in the families of cotton-mill workers, more than half of the cases in these industrial communities were in women and children who never worked in the mills. The suggestion that housework as an occupation favors the development of pellagra is weakened to some extent by the fact that women mill workers were slightly more subject to the disease than the housekeepers in the same mill villages, when due regard is given to the total number of individuals thus engaged. Nevertheless it does seem to us that the high pellagra morbidity in women, children and in old persons of both sexes points to the home as the place where the disease originates in most instances.

The question of the frequency of association between individuals developing pellagra for the first time and persons previously suffering from the disease was suggested by the work of 1912. During 1913 the very complete data secured concerning the population of six mill villages have made possible a study of this question. In this population of 5,514 persons there were 115 cases of pellagra incident in 1912 and 1913. In only 19 of these 115 cases did we fail to find antecedent pellagrins living in the same house or next door, and in 7 of these 19 instances the incident cases had antecedent pellagrin relatives with whom there was evident association. The very definite evidence of close association with a preexisting case in more than 80 per cent. of all new cases in these six villages is the most striking feature of this study of association, and it strongly suggests that association is a factor in the spread of pellagra of much greater importance than has previously been thought to be the case. The essential elements in this association have not been fully examined into as yet. Considerable attention is being devoted to ectoparasites, such as lice and bedbugs, as well as to contact and food contamination as possible factors.

An important feature of the work in 1913 has been the house-to-house study of all the population of the mill-working class in six representative mill villages in Spartanburg County, during which the vital statistics of each person and the food habits of each family were recorded. The data recorded in this way cover a population of more than 5,000 people and have made possible approximately accurate statistical studies of the correlation between the occurrence of pellagra and various *other* ascertained factors. Thus it was found that of the 3,135 persons eating corn meal daily, 98, or 3.1 per cent., were pellagrins, while of the 681 using this food rarely or never, 41, or 6 per cent., were pellagrins. We have analyzed these data in regard to the use of shipped corn meal, local corn meal, any corn meal, fresh meat, canned (tinned) foods, eggs and milk, without discovering any indication that the more frequent use of any one of these foods is associated with an increase in pellagra which would suggest a causal relationship. Those who used meat daily and those who used milk rarely or never did seem to be somewhat more subject to the disease, but the correlation was far from complete. In fact, we found many cases of pellagra among people abstaining from fresh meat altogether, and several cases in persons taking sweet milk or buttermilk regularly once or even twice a day. Our attempt to discover in this way the essential pellagra-producing food or the essential pellagra-preventing food has not been crowned with success and the evidence suggests, to us at any rate, that neither of them exists in the dietary of the population which we have studied.

In this same population our recorded data have enabled us to ascertain whether or not there was any distinct tendency for new cases of pellagra to develop in close proximity to preexisting cases. For the purposes of this study the population of these villages was divided into three zones. The first zone included all persons living in the same house with a preexisting case of pellagra; the second zone all persons living next door to a preexisting case; and the third zone all persons in the same village living at a greater distance than next door from a preexisting case. The result of this study indicated that of the 819 persons in the first zone, that is, living in the same house with a preexisting case of pellagra, 54, or 6.59 per cent., acquired pellagra during the two years 1912 and 1913; in the second zone 1.72 per cent. acquired the disease and in the third zone only 0.52 per cent.

The correlation shown in this study between the incidence of new cases of pellagra and the proximity of domicile to preexisting cases was more striking than we had been led to expect by the results of our first year's work, and it appears to emphasize the significance of very close relationship between the primary and secondary case, such as is provided by actual residence in the same household or in adjacent houses. From the viewpoint of the possibility of transmission of pellagra by blood-sucking insects, one result of this observation has been to direct attention to those insects most intimately domiciled with man, such as the louse, flea and bedbug, rather than to winged blood-sucking insects with a considerable range of flight.

We are confident that such a remarkable indication of the importance of proximity could not have been disclosed except by the intensive study of the disease in the same locality over a long period of time. Certainly the work of our first year did not reveal it. It seems to us that the conclusion is now clearly warranted that in these mill villages pellagra is in some way transmitted to non-pellagrous persons from a preexisting case and that one of the important factors in this transmission is residence in the immediate neighborhood of a pellagrin.

Another feature of our field work in 1913 has been the survey of communities offering marked contrasts in certain particulars. All the mill villages of Spartanburg County were found to be endemic centers of pellagra. All these villages have been using unscreened surface or pail privies for the disposal of human excrement. A careful survey of two other mill villages, one in Oconee County and the other in Chester County, S. C., failed to disclose any cases of pellagra which had certainly originated in these villages, although cases which had originated elsewhere were present. In these villages every house was provided

with a water-carriage flush closet connected with a sewer and this seemed to us to be their most important distinguishing characteristic. In the city of Spartanburg, S. C., the active foci of the disease were confined to those sections of the city in which unscreened surface or pail privies were in use. Of the 241 cases in the city of Spartanburg itself, for which data on disposal of sewage were available, it was found that 230 were using unscreened surface or pail privies. In only eleven instances, or 5 per cent. of the total, was a water-carriage system of disposal employed, and several of these cases arose in sections of the city where unscreened surface privies were in use by their neighbors, some of whom were pellagrins. In several other cities we have learned by more superficial surveys that pellagra is far more prevalent in the unsewered sections than elsewhere. In certain hospitals for the insane we have ascertained that pellagra is usually most prevalent and persistent in the wards housing untidy patients.

All these observations have compelled us to regard inefficient methods for disposal of human excrement as an important epidemiologic feature of those communities in which pellagra is endemic and have led us to recommend the installation of water-carriage systems of sewage disposal as a prophylactic measure against this disease.

Our extension studies beyond Spartanburg County have also included a very complete survey of one village, the peculiar topography of which was of great interest. One portion of this village was near a large pond and nearly every family in this section had suffered from tertian or estivo-autumnal malaria. Another portion of the village was on a swiftly running stream, while the remainder was located on a rather steep hillside. Our survey showed that malaria occurred almost exclusively near the pond, but that dysentery, typhoid fever and pellagra had been endemic in all three sections of the village without evident regard to topography.

These studies were also extended to a large island off the coast of South Carolina, the distinguishing characteristic of which was the absence of streams in which *Simulium* could breed. Pellagra was found to be endemic on this island. In May, 1913, one member of the commission and Mr. A. H. Jennings of the U. S. Bureau of Entomology investigated the epidemiology of pellagra in Texas. Our investigations were undertaken in the so-called Panhandle in the northwestern part of Texas where the rainfall is very slight and where running streams are remarkably scarce. In this region we found cases of pellagra originating. *Simulium* was unknown in this section and the nearest possible breeding places for insects of this genus were from 60 to 125 miles away. It was quite impossible that *Simulium* could have been concerned in the etiology of these cases. These and other observations to be published at a later date have further confirmed us in the conclusion based on our investigations of the prevalence, distribution and habits of *Simulium* in Spartanburg County, namely, that in the territory studied, flies of the genus *Simulium* did not fulfill the necessary conditions to serve as an efficient transmitter of pellagra.

The laboratory studies during 1913 included the inoculation of numerous monkeys, *Macacus rhesus*, with filtered and unfiltered suspensions of material from pellagrins, including saliva, duodenal fluid, feces, tissues from the pharynx, stomach, intestines, brain, spinal cord, blood and lymph from the cutaneous lesions. In addition, monkeys were repeatedly subjected by Mr. A. H. Jennings and Mr. W. V. King to the bites of stable-flies (*Stomoxys calcitrans*) which had been allowed to bite pellagrins, these biting experiments being continued as long as the flies could be kept alive. A considerable proportion of these monkeys died with symptoms of dysentery late in the season and in each case a careful necropsy, including histologic study of the various organs, has been made by Dr. Paul A. Schule. This work has failed to disclose any conclusive evidence that pellagra had been produced in these animals.

The bacteriologic work was directed particularly to the discovery of specific serologic or other allergic reactions on the part of pellagrins toward the various bacterial strains isolated from the intestine. Approximately one thousand bacterial strains have been isolated and studied in this way, but the results of this work have still been inconclusive.

The studies of the cytology of the blood by Dr. O. S. Hillman and Dr. Schule have not disclosed any constant abnormality. A lymphocytosis was observed in approximately 75 per cent. of the cases examined by them.

Heredity as a factor in pellagra has been studied by Dr. C. B. Davenport and Dr. Elizabeth Muncey in collaboration with us. The study of family histories gave some indication of inherited susceptibility to pellagra, but no evidence of inheritance of the disease. Furthermore the apparent transmission of the disease from a woman to her daughter-in-law seemed to be about as common as to her own daughter, provided living conditions and associations were similar, so that even inherited susceptibility cannot be considered as established. This work is being continued this year.

Concerning treatment and prognosis we hope to make a more complete statement at a later time. The fourteen pellagra patients transported to New York by us in 1912 all returned home free from active manifestations of the disease. Two of them died during the following winter of other ailments and eight others have shown recurrent manifestations of the disease, three of them in a severe form. Three cases remained free from recurrence in 1913 and one has not been traced. We are inclined to regard the results of hygienic and dietetic treatment in adults as very comparable to those in tuberculosis, that is to say, the immediate results are often good and the disease appears to be arrested, but on return to former environment and living conditions, recurrence and further progress of the disease is to be expected in the majority of the cases. In children, on the other hand, permanent recovery at home without special treatment is the rule.

SUMMARY

1. The large active foci of pellagra in Spartanburg County were found in and near the large centers of population, and particularly in the cotton-mill villages.

2. Children under the age of 2, adolescents for about five years following puberty and adult males in the active period of life were least frequently affected by pellagra. On the other hand, women from 20 to 44 years of age, old persons of both sexes and children from 2 to 10 years of age were most frequently affected.

3. No definite connection between occupation and the occurrence of pellagra has been found, although the high pellagra morbidity in the women and children points to the home as the place in which the disease is usually contracted.

4. In the group of incident cases most thoroughly studied, evidence of close association with a preexisting case was disclosed in more than 80 per cent.

5. A house-to-house canvass of the homes of over 5,000 people living in six endemic foci of pellagra failed to disclose any definite relation of the disease to any element of the dietary.

6. In these six villages new cases of pellagra originated almost exclusively in a house in which a preexisting pellagrin was living, or next door to such a house, suggesting that the disease has spread from old cases as centers.

7. So far as we have observed, pellagra has spread most rapidly in districts where insanitary methods of sewage disposal have been in use.

8. Additional evidence has been obtained to support the conclusion that flies of the genus *Simulium* have nothing to do with pellagra.

9. Animal inoculations and the experimental study of intestinal bacteria have not yielded conclusive results.

10. The studies of the blood have shown a lymphocytosis in most cases, but have not disclosed any constant abnormality characteristic of pellagra.

11. There is no evidence of inheritance of pellagra.

12. The immediate results of hygienic and dietetic treatment in adults have been good, but after returning to former conditions of environment, most of the cases have recurred. In children, prognosis is very much more favorable.

ATTEMPTS TO TRANSMIT PELLAGRA TO MONKEYS

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Attempts to test the infectivity of pellagra by inoculation in the monkey were made by Anderson and Goldberger[1] in the summer of 1910. Their results were negative. Lavinder[2] repeated and extended these experiments with similar negative results. Singer, MacNeal and Rooks[3] likewise failed to infect rhesus monkeys. A year ago Harris[4] reported the production of pellagra in the rhesus monkey by the inoculation of a Berkefeld filtrate derived from human lesions. This report made it seem desirable to attack the problem anew and as exhaustively as possible.

Work was accordingly started in August, 1913, at the laboratory of the United States Public Health Service, Savannah, Ga., and is still in progress at that place.

At the present time we desire simply to make a brief progress report of this work, reserving full details for the report on the completed work.

INOCULATION OF PELLAGROUS TISSUES

1. *The brain, spinal cord and their membranes* were removed at six necropsies, ground in a meat grinder, mixed with an equal volume of normal saline solution and allowed to extract in the ice-box for periods varying between one hour and eighteen hours. The suspension was then allowed to drip through six thicknesses of gauze without pressure. The gauze filtrate was either injected into animals without further treatment or injected after filtration through a Berkefeld filter. The gauze filtrate was injected intracerebrally, intravenously and subcutaneously into each of two rhesus monkeys; intravenously into 2; intraspinally into 12; intraspinally and intraperitoneally into 4; intracerebrally and intramuscularly into 2; intracerebrally and intraperitoneally into 2. The Berkefeld filtrate was injected intraspinally into 4.

2. *The buccal thoracic and abdominal contents, except intestines,* including tongue, salivary glands, tonsils, esophagus, lungs, heart, diaphragm, stomach, liver, spleen, kidneys, omentum and mesentery were removed at one necropsy and all ground in a meat grinder, a portion of which was treated with saline solution and allowed to stand in the ice-box four hours, after which it was squeezed through gauze. A portion of the gauze filtrate was injected intravenously and subcutaneously into each of seven rhesus monkeys. Another portion of the gauze filtrate, after being passed through a Berkefeld filter, was injected intravenously into three.

3. *The intestines and fecal contents* were removed at seven necropsies, ground in a meat grinder, a portion of which was extracted with saline solution and squeezed through gauze. A portion of the gauze filtrate was injected intravenously into 7 rhesus monkeys and 1 Java monkey. Another portion, after being passed through a Berkefeld filter, was injected intracerebrally, intravenously and subcutaneously into 1 baboon; intravenously and subcutaneously into each of 10 rhesus monkeys.

4. *Skin* from five necropsies was ground in a meat grinder, treated with saline solution, squeezed through gauze and a portion of the gauze filtrate injected intracerebrally, intravenously and subcutaneously into 1 rhesus monkey; intravenously and subcutaneously into 1 rhesus monkey; intracerebrally and intravenously into 1 Java monkey; intravenously into 3 rhesus monkeys; intravenously and subcutaneously into each of 3 rhesus monkeys. A Berkefeld filtrate was injected intracerebrally, intravenously and subcutaneously into each of 2 rhesus monkeys.

INOCULATION OF PELLAGROUS FLUIDS AND EXCRETA

1. *Blood* was drawn from seven pellagrins, and after being either defibrinated or citrated was injected intravenously and intraperitoneally into each of four rhesus monkeys; intravenously into one and intraperitoneally into one.

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* Read before the joint meeting of the Section on Preventive Medicine and the Section on Pharmacology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, June, 1914.

1. Anderson and Goldberger: An Attempt to Infect the Rhesus Monkey with Blood and Spinal Fluid from Pellagrins, Pub. Health Rep., June 30, 1911, p. 1003.

2. Lavinder: A Note on the Inoculation of the Rhesus Monkey with Blood, Spinal Fluid and Nervous Tissue, etc., Pub. Health Rep., June 30, 1911, p. 1005.

3. Singer, MacNeal and Rooks: Attempts at the Experimental Transmission of Pellagra, Report of the Pellagra Commission of the State of Illinois, 1911.

4. Harris: The Experimental Production of Pellagra in the Monkey, etc., THE JOURNAL A. M. A., June 21, 1913, p. 1948.

2. *Pericardial* fluid collected at one necropsy was injected without filtration, intravenously into two rhesus monkeys and after Berkefeld filtration was injected intraspinally into each of two.

3. *Urine* from four pellagrins, each of which showed a marked indican reaction, was injected intravenously after Berkefeld filtration into five rhesus monkeys, each receiving between 90 and 155 c.c.

4. *Feces* from one pellagrin after Berkefeld filtration was injected intravenously (15 c.c.) into one baboon.

5. *Cerebrospinal fluid* collected at three necropsies was injected, without filtration, intracerebrally and intravenously into 1 rhesus monkey and intraspinally into 5. Cerebrospinal fluid collected at 2 necropsies was, after Berkefeld filtration, injected intraspinally into each of 10 rhesus monkeys. Cerebrospinal fluid collected during life from 19 pellagrins and not filtered was injected intraspinally into 19 rhesus monkeys.

FEEDING OF PELLAGROUS MATERIAL AND SPOILED CORN MEAL

1. *Sputum* from ten pellagrins collected fresh each day was fed by stomach-tube to five rhesus monkeys, each receiving 100 c.c. daily and receiving a total of 3,640 c.c., 1,658 c.c., 2,140 c.c., 1,635 c.c. and 915 c.c., respectively.

2. *Feces* collected fresh each day from two pellagrins with diarrhea was mixed with spoiled corn meal and fed by tube into the empty stomachs of eight rhesus monkeys, each animal receiving 100 c.c. daily, 20 gm. of which was meal. The average amount fed to each animal was 1,270 c.c.

3. *The thoracic and abdominal organs and contents* complete from five necropsies were ground in a meat chopper and fed by stomach-tube to sixteen rhesus monkeys and three baboons.

4. *Brain, cord and membranes, buccal thoracic and abdominal organs and contents complete* from one necropsy were ground in a meat chopper and to the mixture was added spoiled corn meal. The entire mass was fed by tube into the stomachs of eighteen rhesus monkeys and one baboon.

ANIMALS USED

The animals experimented on embraced seventy-seven rhesus monkeys, two Java monkeys and three female baboons.

With few exceptions each animal was inoculated by more than one route, with two or more kinds of material, from more than one case and on more than one occasion.

In all, 103 experiments have been made, in which material collected from pellagrins during life or at necropsy was introduced into the stomachs of animals; fifty-two experiments were made in which pellagrous fluids were injected and ninety-six in which extracts, suspensions or emulsions of pellagrous tissue were injected.

The animals have been exposed daily to the direct rays of the sun by being kept in cages in a glass-covered house.

RESULTS

Eight of our animals died after a longer or shorter time following inoculation. In four instances death was plainly due to some cause other than pellagra; in the other four the cause of death was undetermined.

With one exception, the surviving monkeys have so far shown no indications suggesting pellagra.

The exception referred to is as follows:

M. rhesus 98 was injected intraspinally with 6 c.c. of spinal fluid, April 14, 1914, and again inoculated May 2 intraspinally with 4 c.c. of spinal fluid drawn from another pellagrin. The first change in this monkey was noted May 4, 1914, at which time the right forearm appeared slightly swollen and looked as if some of the hair was falling out. The following day the left forearm showed a similar condition. Later both forearms became entirely denuded of hair, the skin became roughened and scaly with large cracks in which appeared a slight serous exudate. Over both wrists the superficial skin seemed to be denuded and the condition gave the appearance of superficial ulceration. On the posterior surface of each hand a similar condition was noticed; the knuckles of the fingers were swollen and reddish and presented cracks and broken skin. May 9 the skin was dry and more scaly. The bowel movements were occasionally loose. Later thick crusts on the skin came away, leaving a pale and slightly scaly surface. The monkey is now again in his usual condition.

The interpretation of these manifestations is not clear. They may, on the one hand, be regarded as non-pellagrous and purely accidental, or, on the other, as indicating pellagra. The former possibility cannot be ruled out. With respect to the latter it is evident that the symptoms may have been brought about by either a living organism or by some unorganized element having a toxic quality. As a definite interpretation is not permissible, no inference as to the communicability of the disease can be made.

THE TREATMENT OF PELLAGRA *

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When I attempt to present to you our present knowledge of the treatment of pellagra, it is that I want to speak of this phase of the problem from the point of view of the pharmacologist and biochemist. Pharmacology, together with pathology, is the foundation of all rational treatment of disease by means of drugs. Biochemistry, on the other hand, is the fundamental science which gives us the basis for a clear understanding of the processes involved in nutrition and metabolism. As the preceding speakers have sufficiently emphasized the fact that the cause of pellagra has been attributed by many authors for nearly a century to the use of a particular kind of food, the discussion of the treatment of the disease from this point of view does not seem uninteresting, and it may possibly contribute to elucidate the still obscure etiology.

All physicians who have had much experience in the treatment of pellagrins agree on one point, namely, that in the milder cases the symptoms will almost always disappear in a relatively short time if the patients are kept in a hospital at rest on a liberal mixed diet, with plenty of fresh meat. The difficulty in carrying out this sort of treatment is that many pellagrins are mentally defective and refuse to comply with the orders of the physician unless forced to understand that this is the only way for an improvement in their

* Read before the joint meeting of the Section on Preventive Medicine and the Section on Pharmacology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, June, 1914.

condition. The attending physician must, therefore, use all available psychotherapeutic methods in order to succeed with the dietary treatment. I cannot enter here into a discussion of the adjustments of the diet in cases associated with vomiting, constipation or diarrhea, which require special dietary measures. It may be said, however, that a mild diarrhea should not be treated with a reduction in the quantity of the diet, as it has been found through metabolic studies that the assimilation of the food is unimpaired in this condition. Constipation is favorably influenced by an increase in the fats of the diet, such as olive oil, butter, cod-liver oil, etc., or by the continued administration of small doses of castor oil. It is interesting to note that patients whose symptoms have disappeared on such treatment will again develop symptoms after having been exposed for several months at their home to the same conditions which prevailed before the onset of the first attack. On the other hand, there are cases on record in which, after dismissal from the hospital, the patients remained well for years. Advanced cases of pellagra, and especially the so-called typhoid pellagra, are often unimproved by any available treatment and end fatally in a shorter or longer period of time.

Let us now turn for a moment to the efficacy of drugs in the treatment of this disease. Lombroso and his school advocated the administration of arsenic in the form of Fowler's solution to pellagrins. Lombroso even went so far as to call arsenic the specific for the disease. His extremely optimistic attitude toward this remedy is not shared by many of his compatriots. In this country arsenic also has its adherents. With the introduction of the cacodylates and salvarsan into therapy, it can be easily understood how these arsenicals were also given a trial in pellagra. Some American authors claim to have had good results from such treatment, while others do not believe in the efficacy of the drug. It cannot be denied that arsenic in any form may be beneficial in many cases of pellagra associated with a loss of body weight and malnutrition, when it seems necessary to make use of this metabolic tonic. Sodium chlorid internally was also advocated by Lombroso, especially for the treatment of pellagra in children. Very little can be said, however, in its favor or in behalf of the dozens of other drugs suggested at different times for the treatment of this disease.

In closing this chapter I should like to call your attention to the fraudulent advertising of proprietary pellagra medicines throughout the Southern states. The manufacturers of these preparations usually claim in a sensational manner that these preparations will positively cure pellagra. Some of these mixtures were analyzed[1] at the Hygienic Laboratory and were found to contain such substances as charcoal, iron salts, small quantities of quinin, etc. It is evident that no cure would be affected by such preparations. "These preparations have usually sold at prices that would be exorbitant for remedies of value in the treatment of the disease. When one considers that most pellagra patients are found among people of small means the advantage taken of the sick and unfortunate by the manufacturers of these nostrums appears in its true light."

Another phase of the treatment concerns the well-known relation between pellagrous erythema and exposure to sunlight. This fact should be a caution to the patient to keep out of bright sunlight as much as possible. Hydrotherapy may be a useful addition to the treatment. Transfer of the patient to a cooler climate seems to be followed by an improvement in the symptoms, provided that the dietary and general hygienic measures are observed. Attention should be called to the fact that pellagra has developed in persons in the northern climates such as Canada, England and our New England States.

Summing up the previous statements it may be said that, owing to the lack of knowledge regarding the etiology of the disease, the treatment is restricted to symptomatic and empirical procedures in which diet and rest figure most prominently.

In conclusion, I should like to offer a few suggestions in regard to the possible explanation of the beneficial effect of a liberal diet on the course of the disease. From a survey of the clinical and pathologic aspects of pellagra, I have arrived at the conclusion that we are dealing with a chronic intoxication. While the agents at work in this intoxication are as yet unknown, I am inclined to believe that toxic substances exist in certain vegetable foods, not necessarily spoiled, which, if consumed by man over a long period of time, may produce an injurious effect on certain organs of the body. This hypothesis does not rule out the possibility that a dietary deficiency, in the sense to be discussed later, may play a rôle in the production and treatment of pellagra. Extensive feeding experiments which I have carried on during the last year with animals, such as mice, rats and a few monkeys, on an exclusive vegetable diet, have shown that these lower animals develop certain gastro-intestinal symptoms, and sometimes die if put on an exclusive diet of corn, carrots, sweet potatoes, oats, etc. Symptoms arise, often within three or four days, which point to the presence of an intoxication in these animals. Death resulted in some cases in a remarkably short time (three to four days). At necropsy constant lesions were found, such as hyperemia and hemorrhage in the gastro-intestinal canal. Sometimes the kidneys, lungs and other organs show a congestion and slightly hemorrhagic condition. Preliminary experiments showed that extracts of these vegetable products, if fed or injected into animals, produced the same symptoms.

In an investigation by Dr. Myers and myself[2] for the purpose of ascertaining the nature of the toxic substances involved in this intoxication, the fact was revealed that relatively large amounts of soluble aluminum compounds were present in these vegetable products. It is very difficult to decide at present whether these aluminum salts have any injurious effect on man in the quantities taken up with the food. Toxic effects from the administration of aluminum salts to animals have been observed, and even a few cases of aluminum poisoning in man have been found in the literature. In view of the fact that the animals which were fed on an exclusive diet of corn or certain other vegetables always showed on necropsy gastro-intestinal lesions, it would seem that this diet, to say the least, produced a disturbance in the function of these organs.

It is not always permissible to apply directly the results obtained through animal experimentation to clinical conditions, but these experiments seem to fur-

1. Public Health Reports, 1914.

2. Public Health Reports, 1914.

nish at least the basis for an understanding of the effect of a change in diet on the course of pellagra. By substituting for part of the vegetable food, animal foodstuffs, such as meat, eggs, etc., the absolute amount of vegetable products consumed will be reduced considerably. Hence we probably also reduce the possibility of an injurious action of the vegetable food on the body, particularly the irritant action on the gastro-intestinal canal. Meat is known to be easily digested by pellagrins, leaving practically no unassimilated residue in the intestine. Meat, furthermore, satisfies the appetite in much smaller quantities than does the voluminous vegetable diet with its relatively large amount of undigested cellulose.

Besides the differences in digestibility and food value in the old sense, we have also to consider the specific effect of each constituent of the diet apart from the question of calories, protein, carbohydrates and fats. In the past all of our attention concerning the nutrition of man was devoted mainly to a study of the heat value of food and the proportion of protein, carbohydrate and fat to each other in a given diet. It is only in the last few years that we have realized that there may occur very important differences in the composition of the individual proteins. The work of Fischer, Abderhalden, Mendel and Osborne has shown the great variation in the composition of protein in regard to its content of the various amino-acids. Feeding experiments with the isolated proteins brought to light the fact that, although all proteins are absorbed and assimilated to about the same degree, yet certain proteins lack or are deficient in certain amino-acids essential for growth and maintenance. Most of the proteins derived from animal sources, with the exception of gelatin, seem to be more suitable for human nutrition, as they contain all the necessary components in the right proportion. Some of the vegetable proteins, on the other hand, seem to be deficient in this respect. It can hardly be denied that the majority of the persons who contract pellagra have lived for years on a mainly vegetable diet. In this way a deficiency in nutrition may take place, but it will require considerable further research to establish the fact that food composed of certain vegetable products is insufficient for the demands of the body.

Quite recently another field in nutrition was opened up through the discovery of the presence of small quantities of new substances occurring in foods which seem to be essential for the maintenance of health. These substances are termed vitamins by Funk. They occur in animal as well as vegetable food in varying amounts. Certain foodstuffs, as polished rice, are extremely poor in vitamins; others, as meats, are relatively rich in these substances. The hypothesis has been advanced by Funk that pellagra is a disease due to the lack of some vitamin in food, analogous to the production of beriberi through the more or less exclusive consumption of polished rice. So far no experimental or clinical proofs have been advanced to support this hypothesis.

Summing up these remarks, we see that our modern conceptions of nutrition and metabolism throw some light on the beneficial effect of a liberal mixed diet on the course of pellagra. In conclusion, I should like to say just a few words in regard to the question as to how these same conceptions may help to explain the etiology. It is probably more than a mere coincidence that the population of that part of the world in which pellagra is endemic lives on a mainly vegetable diet. Economic conditions seem to influence in a general way the diet of people. A vegetable diet is as a rule less expensive, and persons in poor circumstances limit the consumption of the costly meats and other animal food to a minimum. In this connection I should like to call your attention to the fact that pellagra appeared in France soon after the reign of the first Napoleon, a period which was followed by extreme poverty in the country. France recovered from this economic depression in the latter part of the nineteenth century. With this change in economic conditions, partly brought about through the introduction of the more profitable wine industry, pellagra decreased to such an extent that the disease is now very rare in that country. It is impossible to say at present that the food as such is the only factor in the production of pellagra, but even some of the adherents of the infectious theory do not deny that the one-sided diet may be one of the contributing factors in the production of this disease.

The recent advances in the field of nutrition suggest new avenues of approach to the solution of this difficult problem. One will have to consider very seriously:

1. A deficiency or absence of certain vitamins in the diet.
2. The toxic effect of some substances, as aluminum, which occur in certain vegetable food.[3]
3. A deficiency of the diet in certain amino-acids.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. SILER, GARRISON AND MACNEAL; DRS. LAVINDER, FRANCIS, GRIMM AND LORENZ, AND DR. VOEGTLIN

DR. MARCUS HAASE, Memphis, Tenn.: Some three or four years ago the State Board of Health of Tennessee declared pellagra a transmissible disease, required the physician to report it and the case to be isolated. It can be easily seen how utterly impracticable it would be to carry out any such order, as the cases would have to be under constant official surveillance. The staff of the city hospital in Memphis fought that for about a year and succeeded in having the restriction removed so far as the city of Memphis was concerned. We then began taking in pellagrins constantly; and, with very few exceptions, in the past three years there has not been a month that there has not been one or more pellagrins in the city hospital. During that time, in which we have cared for some 150 or more cases, no case of pellagra has occurred in any inmate of the hospital, or among those constantly employed there, in number over 70. No case has occurred among the patients in the hospital that we could trace to any former case of pellagra. The disease is increasing in our district at an alarming rate. While the death-rate of pellagrins has decreased, the morbidity rate has decidedly increased in the past three years.

DR. R. Q. LILLARD, Nashville, Tenn.: As executive officer of the State Board of Health of Tennessee, I want to correct Dr. Haase on one proposition. The question of the quarantine of pellagrins was brought to the attention of the present State Board of Health, a resolution requiring the quarantining of the disease having been passed by the former

3. The possible relation between aluminum and pellagra was also discussed in a recent monograph by Alessandrini and Scala (Contributo nuovo alla etiologia e pathogenesi della Pellagra, Roma, 1914), which the author received at the time of proof-reading. These investigators claim that colloidal silica contained in drinking water is one of the most important etiologic factors, in as much as they succeeded in producing lesions resembling pellagra in animals fed on water containing colloidal silica. Colloidal aluminum hydroxid or a mixture of colloidal silica and alumina produced the same results. In view of the fact, first discovered by us, that aluminum occurs in certain vegetable food in relatively large amounts, the work of the Italian authors furnishes additional evidence that aluminum occupies a prominent position in the etiology of pellagra.

board. I immediately asked the state bacteriologist if he was ready to classify it as a communicable or contagious disease. He said he was not; and the board of health immediately revoked their resolution.

DR. W. C. BROWNSON, Asheville, N. C.: I am fairly familiar with the work of the Thompson-McFadden Pellagra Commission. I know something of how thorough the work has been. While the etiology is still in doubt, it is probable that the disease has some gastro-intestinal cause, and that it may occur from faulty disposition of sewage would seem exceedingly probable. I had no idea that experiments on such an extensive scale had recently been made with monkeys, and after such exhaustive experiments, the fact that most of the monkeys are still living and well, and show no positive signs of the disease would seem to eliminate almost entirely the question of the communicability of the disease from one person to another. It is evident enough that there is no specific for the treatment of pellagra, and the probability is that no medicine does much good. I have had no reason to modify my opinion, expressed long ago, that pellagra should be treated much as we treat tuberculosis, by rest, an abundant nourishing diet, and change of climate when possible. Sodium cacodylate is the most popular medicine at present. Salvarsan has been recommended as a specific, but to me, there is no evidence that it has done good. Sodium cacodylate may do good at times. Two years ago I used it in a number of cases. Most of them seemed to do well. Last year not a single patient with whom I used it seemed to derive any benefit whatever.

DR. W. T. SHELL, Corsicana, Texas: I concur with Dr. Siler that pellagra is a gastro-intestinal trouble. I have used the arsenic preparations, sodium cacodylate and salvarsan in quite a number of cases, but find that better results may be obtained from the gastro-intestinal treatment.

DR. JOHN L. JELKS, Memphis, Tenn.: As the original exponent of the intestinal-infection theory as to the etiology of pellagra, I wish to relate a few things I have observed. Some years ago, I referred to the ameba, which I believed then to be the cause, and in the first part of April, 1910, I presented a pellagrin before the Tennessee State Medical Association, who was suffering from chronic amebiasis. I now have a case, apparently of pellagra, presenting pellagrous skin lesions on elbows and legs. This patient I know has had amebiasis twelve years. I saw him, and made the diagnosis twelve years ago. This man is being nursed by a woman who was brought to me from Mississippi, and was treated by me for pellagra. I performed an appendicocecostomy on her, which enabled me to treat the condition rationally, as I view it. That woman is well. She is a little nervous yet, but any one would pronounce her entirely well. The man she is nursing, as in the case of pellagra, exhibits a profound toxemia, and is quite tender along the cervical region. Pellagra represents the results of a profound toxic effect on the blood and nervous system, and the ameba, I believe, is often the cause. I have observed a great increase in the bacillary contents of the intestine, and in one case, reported in my chapter on Dysentery in Hirchman's book, I observed in the *Amœba histolytica*, blunt non-motile bacilli, which were somewhat larger at one end. This was in a case of amebic dysentery of long standing, and a well-defined case of pellagra. The first case reported by me, as stated, was April 12, 1910. A year earlier, however, I reported cases of the skin manifestations of amebiasis. A negress, the body-servant of the nurse referred to, has pellagra. The nurse did not contract the disease direct from the servant, but it is probable that both contracted the disease from polluted water or infected vegetables. In our part of the country, the vegetable gardens are being infected, and infected vegetables are going to prove a greater menace to the health of our people than we realize at present. I cannot ascribe an etiologic significance either to corn or to the *Simulium reptans*. I am rather inclined to the bacillary toxic origin, though the ameba may be the host. Salvarsan never cured a patient. The results obtained by its use were from the salt solution, which washed the toxic blood and diluted the toxins. The same results would have been obtained from salt solutions. The treatment must be begun in the early stages, before irreparable damage has been done to the central nervous system, for, thereafter, there is no cure.

DR. ROBERT WILSON, JR., Charleston, S. C.: In Charleston we gave up, some time ago, the theory advanced by Dr. Sambon that the possible carrier is a *Simulium*, for while cases of pellagra are fairly numerous the simulium is not found. Several pellagrins have come under my observation who were born in Charleston, and have never been out of the city. On Johns Island, a sea island near the city, which, if I am not mistaken, is the one alluded to by Dr. Siler, pellagra has existed for a number of years. This island is one of the low sandy islands of the coastal region, and there are no running streams on it, and no *Simulidae*. It is my impression, although I am not able to give statistics off hand, that with us pellagra is much more common in the negro than it seems to be in the upper part of the state where the Thompson-McFadden Commission have been working. I was much interested in hearing Dr. Siler's conclusion with regard to the possible influence of soil pollution on the prevalence of pellagra. In Charleston it is only recently that we have introduced a water-carriage system of sewage disposal, old-fashioned surface privies having been in use for a great many years, with consequent soil pollution. This may possibly explain the relatively large amount of pellagra which occurs in Charleston. It will be exceedingly interesting to note if the introduction of the new sewage disposal system and the destruction of the surface privies will be followed by a diminution in the prevalence of pellagra.

DR. WARD J. MACNEAL, New York: In 1910 the Illinois Pellagra Commission undertook to transmit pellagra to monkeys, using *Macacus rhesus*. Something over 100 monkeys were used. Many of the animals were injected with blood; some with cerebrospinal fluid; others with tissues taken at necropsy. Some rather curious and interesting skin lesions developed in a few of these animals, but nothing which we could recognize as typical of pellagra. Many of the monkeys lived two years after inoculation. The Thompson-McFadden Pellagra Commission has now used about 125 monkeys in the work which was reported here. Some of these animals have lived considerably more than two years after being inoculated and, so far, we have been unable to see in any of them, anything which we could regard as a reliable sign of pellagra. The skin lesions which most closely resembled those seen in human pellagra occurred in one of the animals that we saved as a control. It seems to me very important that a considerable number of animals should be kept as controls in all such experiments. It is exceedingly difficult to make a diagnosis of pellagra in a monkey satisfactory to everybody. I would like to ask Dr. Francis about the time interval between inoculation and the appearance of the lesions. It seems rather important also to know how long after the material was collected it was introduced into the monkeys. This is particularly important in the one instance in which the suggestive skin lesions were obtained. The details with regard to that one animal would be of interest. Something may be said concerning the prognosis in pellagra. One might get the idea from Dr. Voegtlin's paper that typhoid pellagra is invariably fatal. One case of this type occurred in the Illinois State Hospital at Kankakee. The patient was in a typhoid state for a period of three or four days, yet she recovered from the attack and has remained free from recurrence for four years. In another patient, observed in 1912, occurred one of the severest attacks of pellagra that I ever saw. The patient was in a typhoid state for a week, yet she recovered from that attack and has since had no recurrence. There is some indication, therefore, that these severe attacks of pellagra are not necessarily fatal. Accurate prognosis is exceedingly difficult in any of these cases. Dr. Voegtlin stated that pellagra could not be found except in people who had lived for many years on a vegetable diet. I don't know on what observations that statement has been based; but it seems to me there is good indication that pellagra can be recognized in some

persons, particularly in children 2 or 3 years old, who have not lived very long on a vegetable diet; who have, in fact, lived on a diet consisting largely of milk. It seems to me that that statement ought not to pass unchallenged.

Dr. Claude Smith, Atlanta, Ga.: If this case had been referred to Dr. Siler, what would the commission's reply have been, and in the light of their present knowledge, what would they advise with regard to the handling of pellagra cases? In addition to the question which Dr. MacNeal has asked as to the time of inoculation, will Dr. Francis state the type of inoculations made on this monkey, and the length of time which had elapsed when the lesions appeared?

Dr. J. F. Siler, New York: Dr. Smith has asked a difficult question; one which it is not possible to answer definitely. It is our opinion that pellagra is an infectious disease. Our epidemiologic and laboratory studies have not, so far, given us any definite clue as to the probable nature of the hypothetic virus. We advise in these cases improvements in sanitary conditions. The things which we consider most important are personal cleanliness, thorough screening of dwelling-houses and improvements in methods of disposal of excreta. We stress the importance of having fly-proof privies and screened dwellings, not only as a possible protection against pellagra but also as preventive measures for such common diseases as typhoid, dysentery, hookworm, summer diarrheas, malaria, etc. Dr. Haase spoke of the fact that pellagra never spreads in hospitals. This is interesting and difficult to explain. I studied pellagra at the Peoria State Hospital when the disease existed there in epidemic form. There were about 175 cases or 8 per cent. of the inmates. None of the nurses or doctors contracted the disease. This institution had, during the same period of time, about 75 inmates showing active symptoms of tuberculosis and also an epidemic of amebic dysentery. None of the nurses or doctors, so far as I could learn, showed any evidence of having contracted tuberculosis from these patients, nor did any of them have dysentery. It will, I think, be admitted that the character and degree of association between nurse and pellagra patients in hospitals and the environmental conditions surrounding this association, are quite different from those existing in the homes of the element of the population in which pellagra is found most frequently. As a matter of fact, I know that a number of physicians in the Southern States have had pellagra and I have had reports of pellagra in five nurses. These are merely unconfirmed reports, however, which we hope to investigate fully. In our investigations in the South, the entomologists from the Bureau of Entomology who are collaborating with us have found the bedbugs are practically universal in the element of the population most frequently affected by pellagra. This applies particularly to mill communities where pellagra is most prevalent. One striking feature of the epidemiology of pellagra is that males between 20 and 45 years of age seldom contract it. In this age period there are about nine females to every male pellagrin. It cannot be said that adult males are relatively immune to the bites of bedbugs.

Dr. John Ritter, Chicago: Is it considered a fact that the bedbug is a carrier of pellagra infection?

Dr. Edward Francis, Washington, D. C.: Dr. MacNeal has asked for some specific data with regard to Rhesus 98, the monkey which showed the skin eruption. This monkey was injected intraspinally with 6 c.c. of spinal fluid, April 14, 1914, and was again inoculated May 2, intraspinally, with 4 c.c. of spinal fluid drawn from another patient. Both pellagrins were insane.

Dr. Carl Voegtlin, Washington, D. C.: The Thompson-McFadden Pellagra Commission asserts that pellagra is an infectious disease. The proofs advanced so far are only indirect and, therefore, not conclusive. The methods used by the Commission for the study of the relation of food to pellagra are defective inasmuch as they do not take into full consideration the quantity and quality of each food in the diet. It is a great mistake to make such superficial dietary studies, which often lead to false conclusions, a fact well illustrated in the history of the etiology of beriberi. Not every person who consumes polished rice contracts beriberi, because the production of this disease depends on the quantity of polished rice consumed as well as the quantity and quality of the other foods contained in a particular diet. It would be absolutely wrong to say that, because many people eat polished rice daily together with other food without getting beriberi, rice did not have anything to do with beriberi. This fact was well brought out in the feeding experiments in the Japanese navy. As soon as part of the polished rice was replaced by certain other food, beriberi began to disappear. Yet the Japanese sailors still had rice in their daily ration. The dietary studies carried out by the experiment stations of the Department of Agriculture in various sections of the Southern States are of much value, as they determine the amount of each food consumed by the various families. These studies plainly show that the vegetable foods preponderate greatly over the animal food in the diet commonly used in the South. Sometimes the diet consists entirely, as you may know, of corn and fat pork.

I admit that the question of the appearance of pellagra in young children in its relation to food is a difficult problem to solve. I think, however, that there exists a possibility of explaining it on the assumption that toxic substances are consumed by the mother which are excreted with the milk and cause an intoxication of the infant. Another possibility is the absence of certain substances—vitamins—in the milk. It is well known that nursing mothers who have beriberi will often give the disease to their infants. As soon as the infants receive normal milk the symptoms will disappear. There exists, therefore, an intimate relation between the composition of the milk of the mother and the health of the infant. If the infant is fed on cow's milk we may deal with a similar proposition. Cows eat exclusively vegetable food, and it is quite possible that certain toxic substances consumed will go over into the milk. We found, for instance, that cow's milk contains considerable quantities of aluminum. Of course I admit that this is all indirect evidence and does not prove definitely that pellagra is a disease due to a dietary deficiency or to the presence of toxic substances in the diet. On the other hand, I can say that just as much weight of argument is on the side of the nutrition theory as on the side of the infection theory.

IMMUNITY IN TUBERCULOSIS

FURTHER EXPERIMENTS *

GERALD B. WEBB, M.D.
AND
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COLORADO SPRINGS, COLO.

In 1911, experiments were reported[1] on twelve monkeys. The subsequent history of those not killed at that time follows:

Monkey 1.—Control. Jan. 19, 1912. The monkey had not become spontaneously infected since its purchase, June 8, 1910.

Oct. 14, 1912: Intradermal tuberculin test 0.1 mg. O. T. Result negative.

Dec. 1, 1912: Animal has refused to eat for three days. Found dead. Necropsy, no trace of tuberculosis anywhere.

Monkey 2.—Received 25 virulent human tubercle bacilli by subcutaneous injection. June 9, 1910, thirty-five bacilli of this culture had infected a guinea-pig (Barber culture). June 7, 1911, killed. No evidence of tubercle anywhere. Lymph-nodes from various parts ground up and injected into guinea-pig without producing infection.

* This work was assisted by a grant from the Committee on Scientific Research of the American Medical Association.

* Read before the Section on Pathology and Physiology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

1. Webb, G. B., and Williams, W. W.: Immunity in Tuberculosis, The Journal A. M. A., Oct. 28, 1911, p. 1431.

MONKEY 3.—Received 100 virulent human tubercle bacilli by subcutaneous injection, of same culture, June 8, 1910.

Sept. 6, 1911: Conditions resembling elephantiasis had developed. Animal killed. Lower half of vulva, buttocks, tail, legs, showed dense infiltration of skin about ½ inch in thickness. The swollen parts were soft but firm. Edematous, not reddened. All organs normal. No signs of tuberculosis anywhere. Pieces of swollen area, lymph-nodes from various parts ground up and injected into guinea-pig without infection resulting.

MONKEY 4.—Received 200 human tubercle bacilli of same culture by subcutaneous injection, June 8, 1910.

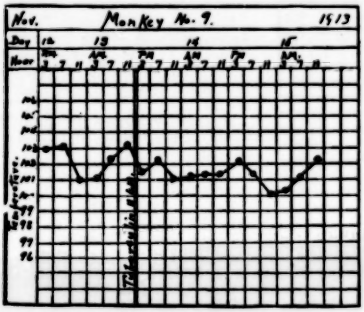

Chart 1.—Temperature chart of Monkey 9.

Dec. 27, 1911: Killed. No evidence anywhere of tuberculosis.

MONKEY 5.—Received in increasing doses, beginning with 1 bacillus, 3, 5 bacilli, etc., a total of 8,369 virulent human tubercle bacilli from June 8, 1910, to Feb. 3, 1911.

Dec. 21, 1911: Killed. No evidence anywhere of tuberculosis.

MONKEY 6.—Received similar inoculations to Monkey 5.

June 24, 1912: Second intradermal tuberculin test with 3.8 mg. O. T. Result negative.

Oct. 8, 1913: Third intradermal tuberculin test with 1 mg. O. T. Result negative.

Oct. 12, 1913: Found dead in cage. Necropsy. Scattered tubercles in left lung. Lower lobes of right lung solidified; caseous areas and adherent to chest wall. Spleen badly infected. Bronchial glands contain pus. Original culture recovered from this monkey.

MONKEY 7.—Received in increasing doses beginning with 1 bacillus, 5, 10, etc., a total of 417,961 virulent human tubercle bacilli from June 8, 1910, to Feb. 3, 1911.

Dec. 7, 1912: Has refused to eat for a few days. Found dead. Necropsy: No trace of tuberculosis in any organ.

COMMENT.—Monkeys 1 and 7 were kept in the same cage. The culture given them for a test of immunity had originally infected a guinea-pig with only 125 bacilli. It was now found that 100,000 failed to infect a guinea-pig. It was later discovered that their keeper had given them oats a few days before their mysterious deaths.

MONKEY 8.—Inoculations given ip increasing dose as in Monkey 7. Total bacilli received, 417,961. Necropsy June 8, 1911: No tuberculosis.

MONKEY 9.—Received inoculations of virulent human tubercle bacilli beginning with 5 bacilli, 10, 15, etc., from June 8, 1910, to Feb. 3, 1911. Total, 15,720.

June 24, 1912: Intradermal tuberculin test, 3.8 mg. O. T. negative.

May 29, 1912: Weight, 4,703 gm.

Oct. 14, 1912: Weight, 5,754 gm.

Nov. 12, 1913: Subcutaneous test. See Chart 1.

June 15, 1914: Apparently perfectly well. Killed. Necropsy; No tuberculosis.

MONKEY 10.—Received inoculations of virulent human tubercle bacilli (Barber culture), beginning with 5 bacilli, 15, 30, etc., from June 8, 1910, to Feb. 3, 1911. Total, 37,805.

June 24, 1912: Intradermal tuberculin test, 3.8 mg. O. T. negative.

Jan. 3, 1913: Through the courtesy of Dr. Penrose, this monkey and also Monkey 12 were accepted by the Philadelphia Zoological Society. Both were retested with tuberculin before admission and found to be negative.

June 16, 1914: Dr. Herbert Fox reports: Both monkeys negative to tuberculin on admission. Not since tested. Both monkeys have failed a little in weight in last few months and Monkey 10 has slight cough. These monkeys have been possibly more exposed to the public than the others in the gardens. They have now been removed to outdoor cages.

MONKEY 11.—Control, killed. No tuberculosis.

MONKEY 12.—Received 50 virulent human tubercle bacilli at one dose, June 8, 1910.

May 22, 1911: Subcutaneous O. T. test negative.

May 21, 1912: Gave birth to dead baby.

June 24, 1912: Intradermal tuberculin test, 3.8 mg. O. T., negative.

Jan. 3, 1913: Forwarded to Philadelphia Zoological Gardens.

June 16, 1914: Report by Dr. Herbert Fox above: This animal we regarded as a control possibly to Monkey 10. Fifty virulent bacilli had not infected.

Twelve new monkeys (*Macacus rhesus*) were received June 17, 1912.

June 18, 1912: Conjunctival tests with 2 per cent. O. T. in right eye of each. All negative.

June 18, 1912: Simultaneously a von Pirquet test with pure O. T. was made in the neighborhood of the left nipple. All negative.

June 18, 1912: Differential blood-counts were made and the opportunity was taken to investigate any possible increase in their lymphocytes due to the altitude. Chart 2 depicts the results.

Oct. 14, 1912: Monkeys 13 and 14 tested with O. T., 0.1 mg., intradermally. Monkey 14 reacted markedly with 150 per cent. increase. Chart 3 illustrates the change in the differential blood-picture in this monkey.

MONKEY 13.—Having been in cage with Monkey 14, was not used for experiment. After two months exposure was killed.

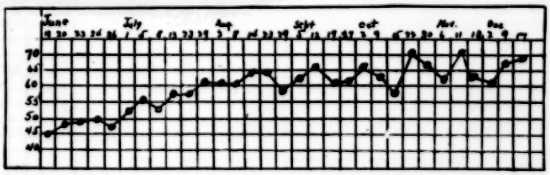

Chart 2.—Average mononuclear percentage of twelve monkeys.

Nov. 12, 1913: Subcutaneous tuberculin test appears negative (Chart 4).

Jan. 12, 1914: Lymphocytes had dropped from 63 to 14 per cent. Blood-platelets 596,000. White corpuscles 24,000.

Jan. 16, 1914: Evidently ill. Killed. No microscopic evidence of tuberculosis could be found except extensive adhesions about right lung. Entire base tightly bound down. Both adrenals very soft, mushy and necrotic. Smears showed no tubercle bacilli.

MONKEY 14.—Oct. 14, 1912: Reacted to intradermal test as stated above.

Jan. 29, 1913: Killed. Peritoneum covered with tubercles. Spleen large and filled with caseous masses. Extensive

lesions in liver. Scattered tubercles in lungs. This monkey was evidently infected on arrival or shortly after. The positive intradermal reaction was the first we had experienced in any monkey and the decisiveness convinced us that those reported in our former papers were probably not positive.

Through the courtesy of Dr. Lawrason Brown of Saranac, a culture (Brown C_4) was received from which Dr. Brown had been able to infect a guinea-pig with 20 bacilli. We wished to ascertain how many bacilli of this culture would, inoculated subcutaneously, infect a monkey.

Preliminary experiments were made on guinea-pigs with results mentioned below.

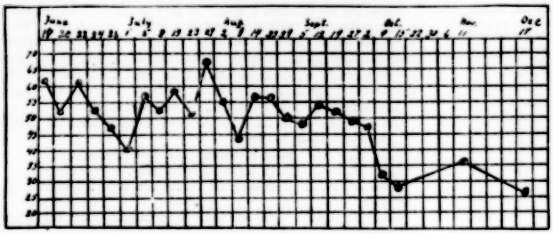

Chart 3.—Percentage of mononuclears, Monkey 14.

GUINEA-PIG 2.—Twenty-five bacilli inoculated into right nipple area.

GUINEA-PIG 3.—Nov. 11, 1912: Several thousand bacilli inoculated into right nipple area.

GUINEA-PIG 4.—Twenty-five bacilli inoculated into right nipple area.

GUINEA-PIG 5.—Fifty bacilli inoculated into right nipple area.

GUINEA-PIG 6.—Fifty bacilli inoculated into right nipple area.

GUINEA-PIG 7.—One hundred bacilli inoculated into right nipple area.

GUINEA-PIG 8.—Ten bacilli inoculated into right nipple area.

All pigs became definitely infected and tuberculosis was confirmed by necropsies.

This culture, from which only *ten* bacilli could cause infection, was evidently more virulent than any we had before employed.

Inoculations were made into guinea-pigs in increasing doses as the records indicate (Tables 1 and 2), but each pig finally developed tuberculosis.

TABLE 1.—INOCULATIONS INTO GUINEA PIG 6

Date	Tubercle Bacilli	Date	Tubercle Bacilli
1/ 9/13	2	2/ 3/13	14
1/13/13	4	2/ 6/13	16
1/16/13	6	2/10/13	20
1/20/13	8	2/13/13	25
1/23/13	9	2/17/13	30
1/27/13	10	2/20/13	35
1/30/13	12*	2/24/13	40

Feb. 27, 1913: Pig has local lump at inner side of left nipple.

TABLE 2.—INOCULATIONS INTO GUINEA-PIGS 30, 31 AND 32

Date	Tubercle Bacilli	Date	Tubercle Bacilli
5/19/13	R 2	6/23/13	L 12
5/26/13	R 4	6/30/13	L 14
6/ 2/13	L 6	7/ 7/13	R 16
6/ 9/13	L 8	7/10/13	R 20
6/16/13	L 10	7/21/13	R 20

Injections were made into right and left nipple areas according to designation R or L.

July 21, 1913: Probable infection of groin glands on left side.

Sept. 3, 1913: Definite infection of groin glands on left side.

MONKEY 15.—Jan. 20, 1913: Three hundred bacilli, Culture Brown C_4, inoculated just below left nipple.

March 4, 1913: Large local lesion at site of inoculation. Enlarged gland in left axilla. Intradermal tuberculin test + + (positive).

March 6, 1913: Killed. Local lesion and infected axillary gland. Otherwise no evidence of tuberculosis.

MONKEY 16.—July 1, 1912: Broken leg, discarded. Necropsy negative.

MONKEY 17.—Oct. 31, 1912: Prolapsed bowel, discarded. Necropsy: lobar pneumonia.

MONKEY 18.—Jan. 20, 1913: Four hundred bacilli, Culture Brown C_4, inoculated just below left nipple.

March 4, 1913: Large local lesion. Enlarged hard gland in left axilla. Intradermal tuberculin test + + (positive).

March 24, 1913: Sent to Dr. John F. Anderson, Public Health Service, Washington, D. C. This monkey was ideally infected for an attempt at cure by the Friedmann remedy, but died after a few months.

MONKEY 19.—March 31, 1913: Sixty bacilli, Culture Brown C_4, injected near right nipple.

June 26, 1913: No local lesion or enlarged glands.

Nov. 12, 1913: Subcutaneous tuberculin test (Chart 5) negative.

June 3, 1914: Killed. Necropsy completely negative.

MONKEY 20.—March 31, 1913: Twenty-five bacilli, Culture Brown C_4, inoculated near right nipple.

May 7, 1913: No local lesion.

May 29, 1913: No local lesion or glands enlarged.

Nov. 13, 1913: Tuberculin reaction (subcutaneous test). Notice (see Chart 6) interference with night drop. Probably positive.

Dec. 10, 1913: Found dead. Necropsy negative except for a pus-sack in lesser peritoneal cavity. No tubercle bacilli could be found on staining this pus. No enlarged bronchial glands.

MONKEY 21.—Nov. 12, 1913: Subcutaneous tuberculin test (Chart 7) negative.

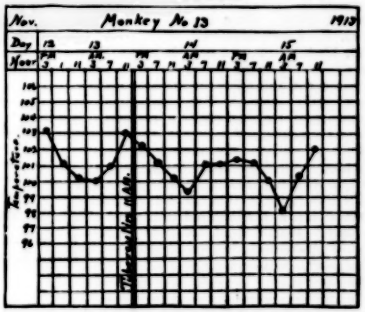

Chart 4.—Temperature chart of Monkey 13.

Jan. 8, 1914: A burn made above left ankle which produced a linear scar.

Feb. 26, 1914: Three hundred bacilli (Culture Brown C_4) injected into scar. The site of inoculation bled and the blood was reinjected into two other places in scar.

MONKEY 23.—Nov. 12, 1913: Subcutaneous tuberculin test (Chart 9) negative.

Feb. 26, 1914: Three hundred bacilli (Culture Brown C_4) injected into left leg.

Blood Examinations:

MONKEY 21.—Feb. 27, 1914: Platelets 468,000. Whites 12,600. Lymphocytes 64.5 per cent.

MONKEY 23.—Feb. 27, 1914: Platelets 400,000. Whites 11,000. Lymphocytes 54.5 per cent.

MONKEY 21.—March 10, 1914: Platelets 532,000. Whites 16,600. Lymphocytes 64.5 per cent.

MONKEY 23.—March 10, 1914: Platelets 416,000. Whites 17,060. Lymphocytes 57 per cent.

MONKEY 21.—March 12, 1914: Platelets 516,000.

MONKEY 23.—March 12, 1914: Platelets 384,000.

MONKEY 21.—March 25, 1914: Platelets 542,000. Lymphocytes 72 per cent.

MONKEY 23.—March 23, 1914: Platelets 504,000. Lymphocytes 60 per cent.

MONKEY 23.—April 1, 1914: Has a local lump. No enlarged glands.

April 2, 1914: This lump removed under ether.

April 3, 1914: Good healing. No glands in either monkey.

MONKEY 21.—Platelets 596,000.

MONKEY 23.—Platelets 440,000.

April 28, 1914: Both monkeys killed. Necropsy:

MONKEY 21.—Several tuberculous nodules in liver, also liver abscess. Tuberculous glands in peritoneum. The scar had become ulcerated and had bled easily. No inguinal glands were infected.

MONKEY 23.—Necropsy completely negative.

MONKEY 22.—March 31, 1913: Ten bacilli (Culture Brown C_4) injected just below right nipple.

May 7, 1913: No local lesion.

July 29, 1913: No local lesion or enlarged gland.

Nov. 12, 1913: Subcutaneous tuberculin test (Chart 8) negative.

Aug. 3, 1914: Killed. Necropsy negative.

MONKEY 24.—March 31, 1913: One hundred bacilli (Culture Brown C_4) injected near right nipple.

May 28, 1913: Local lesion, hard lump. Enlarged gland in right axilla.

May 29, 1913: Under ether local lesion and enlarged gland and axillary gland completely removed.

June 26, 1913: Complete healing, no evidence of enlarged glands or return of lesion.

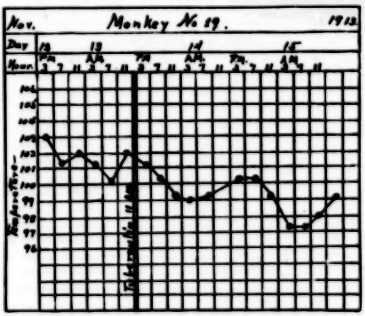

Chart 5.—Temperature chart of Monkey 19.

Sept. 10, 1913: Killed. Portions of left eye and left side of neck swollen. Extensive tuberculosis of lungs, spleen and bronchial glands. Glands over sternum and in neck all purulent. Few tubercles in liver. No local glands in right axilla.

GUINEA-PIG 55.—Dec. 29, 1913: Given 200 bacilli (Lil culture) at nipple area.

Jan. 18, 1914: Local lesion and enlarged inguinal gland.

Jan. 20, 1914: Nipple, local lesion and inguinal glands removed and entire groin cleaned out down to muscles under ether.

March 5, 1914: Groin entirely healed.

April 11, 1914: Killed. Extensive tuberculosis of liver, spleen and lungs.

The following attempt to treat tuberculous guinea-pigs with inoculations of living tubercle bacilli is of interest:

Dec. 19, 1912: Guinea-Pigs 13, 15, 16 and 17, weighing about 500 gm., were each given 25 bacilli of Culture Brown C_4 in right nipple area.

Jan. 13, 1913: Each pig has slightly enlarged and hard right inguinal gland. Pigs 16 and 17 were used as controls. Pigs 13 and 15 were given inoculations of live tubercle bacilli from the same culture as that producing the infection. These

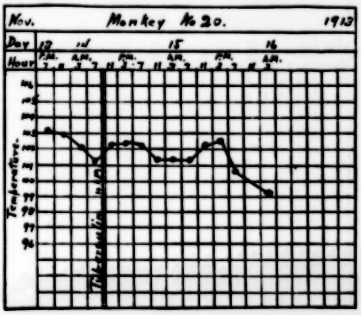

Chart 6.—Temperature chart of Monkey 20.

inoculations were given in the left nipple area, the numbers given being slowly increased from 1 to 60 during a period of twelve weeks.[2]

Table 3 gives the numbers given and the dates.

TABLE 3.—INOCULATIONS INTO GUINEA-PIGS 15 AND 13

Date	Tubercle Bacilli Guinea-Pig 15	Tubercle Bacilli Guinea-Pig 13	Date	Tubercle Bacilli Guinea-Pig 15	Tubercle Bacilli Guinea-Pig 13
1/ 9/13	2	..	2/10/13	20	14
1/13/13	4	1	2/13/13	25	16
1/16/13	6	3	2/17/13	30	20
1/20/13	8	5	2/20/13	35	25
1/23/13	9	6	2/24/13	40	30
1/27/13	10	7	3/ 3/13	45	35
1/30/13	12	8	3/10/13	50	40
2/ 3/13	14	10	3/27/13	50	40
2/ 6/13	16	12	4/ 3/13	60	50

April 21, 1913: Guinea-Pig 13 had discharging sinus in right nipple area. Killed. Large inguinal glands on right side. Large local lesion. Few tubercles in spleen. Otherwise negative.

May 8, 1913: Guinea-Pigs 15 and 16 were killed. Each had dry ulcer and large local lesion. Right inguinal glands were of equal size. Guinea-pig 16 showed no other tuberculous lesions. Guinea-Pig 15 had a few tubercles in spleen and very minute enlarged bronchial glands.

Nov. 22, 1913: Guinea-Pig 17 killed. Local lesion and right inguinal glands same as others. No other tuberculous lesions. This experiment certainly failed to show any favorable action due to the treatment given. Two pigs in the same series, Guinea-Pigs 14 and 18, treated with tuberculin showed much more extensive and widespread tuberculosis.

It has probably been taken for granted that virulent cultures are all of equal potency. By means of the Barber technic of isolating definite small numbers it may be shown that this is not the case.

2. These experiments also prove that a tuberculous guinea-pig is immune to subsequent small lethal doses inoculated subcutaneously. "Römer, and following him Tomarkin, were able to show a sustained resistance of moderately tuberculous guinea-pigs toward a fresh cutaneous inoculation. A similar immunity toward a subcutaneous dose, so far as I know, has not yet been demonstrated."—Smith, Theobald: An Attempt to Interpret Present-Day Uses of Vaccines, THE JOURNAL A. M. A., May 24, 1913, p. 1591.

Table 4 gives a list of certain cultures and the smallest number so far found capable of producing progressive and fatal tuberculosis in adult guinea-pigs.

TABLE 4.—POTENCY OF FATAL CULTURES

Cultures	Minimum Lethal Number
1. B	120 bacilli
2. Barber	35 bacilli
3. Brown C_4	10 bacilli
4. Lil	35 bacilli
5. Bd	10 bacilli
6. Bh	50 bacilli
7. Rgls	10 bacilli

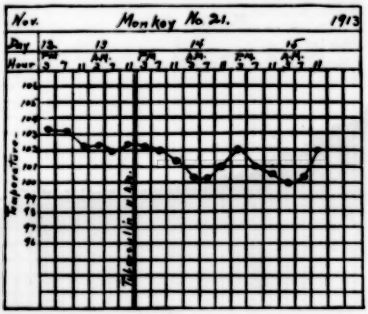

Chart 7.—Temperature chart of Monkey 21.

Culture 1 has already been described.[3] Three years later this culture from which 120 bacilli had infected a pig, had so decreased in virulence that 100,000 failed repeatedly to infect a guinea-pig.

Culture 2 has also been described.[4]

Culture 3 was isolated in Saranac Lake from the sputum of an advanced consumptive.

Cultures 4, 5, 6 and 7 were grown from the sputum of advanced active cases of pulmonary tuberculosis by means of the antiformin method grown on Dorset's egg-medium and tested within a few months after first obtained.

The following experiment was undertaken to compare the infection produced by the same dosage in two very young guinea-pigs, A and B, a pregnant female pig, C, a nursing female pig, D, and a normal male pig, E, weighing, respectively, 163, 128, 709, 591, and 573 gm.:

Jan. 13, 1914: Each pig received 60 bacilli, Culture "Lil."

March 29, 1914: A died of extensive tuberculosis.

April 12, 1914: B died of extensive tuberculosis. C, D and E in good health.

June 8, 1914: C, D and E killed. Necropsies showed: C, very extensive tuberculosis; D, no evidence of tuberculosis; E, moderate amount of tuberculosis.

It is of course possible that D failed to receive the bacilli at the time of inoculation. The disease made more rapid progress in the pregnant female than in the normal male and was of a galloping type in the tiny pigs.

Very young guinea-pigs would seem to be much more susceptible to infection by a definite number of bacilli than the older pigs used.

3. Webb and Williams: Immunity Production by Inoculation of Increasing Numbers of Bacteria Beginning with One Living Organism, Tr. Sixth International Congress on Tuberculosis, 1908.

4. Webb, G. B., and Williams, W. W.: Immunity in Tuberculosis: Its Production in Monkeys and Children, THE JOURNAL A. M. A., Oct. 28, 1911, p. 1431.

The following experiments on calves are of interest as they indicate the small number of virulent bovine bacilli which may cause infection, and also that a calf can apparently overcome a mild infection.

Table 5 shows the approximate number of virulent bovine bacilli given to the different calves on the various dates.

TABLE 5.—INOCULATIONS INTO CALVES

Calf No.	Age, Weeks	9/20/11	10/4/11	11/15/11	12/1/11	12/11/11	1/20/12	2/13/12
1.	3	50	....	....	5,000	100,000	1,000,000	50 million
2.	13	50	250	500	5,000	.....	5 80,000	5 million
3.	3	50	250	500	5,000	100,000	1,000,000	50 million
4.	2	..	....	....	500	100,000	1,000,000	50 million
5.	3	..	....	....	500	5,000	500,000	5 million
6.	1	..	....	....	5.00	5,000	500,000	5 million
7.	3	..	....	....	.....	.....	.....	1,000
8.	3	..	....	....	.....	.....	.....	1,000

March 13, 1912: The intradermal test of Romer was applied to calves 1-6; 50 mg. O. T. was used for each calf. Calves 1, 2, 4, 5 and 6 were positive.

March 21, 1912: The same test was repeated, and all calves, including Calves 7 and 8, were positive.

April 10, 1912: Given subcutaneous tuberculin test and all temperatures taken for thirty-six hours. Calves 1, 7 and 8 were considered suspicious.

April 12, 1912: Calves 5 and 6 killed. Necropsy: One left internal iliac gland in each contained hard calcified healed tubercles. All other glands normal. Otherwise negative.

Oct. 1, 1912: Subcutaneous tuberculin test repeated. Calf 1, typical reaction. Calf 3, not typical reaction but is sick clinically.

Oct. 8, 1912: Calves 1 and 3 killed. Necropsy: Calf 1, fat and in fine condition. No tuberculosis found anywhere. Calf 3, thin and small. One large gland filled with pus on outer side of each thigh at site of inoculations. Pus contained tubercle bacilli. Other glands and rest of body entirely negative.

June 15, 1914: Calves 2, 4, 7 and 8 have been since tested, once with the subcutaneous, and three times with the intradermal method, during the last two years and all tests have been negative.

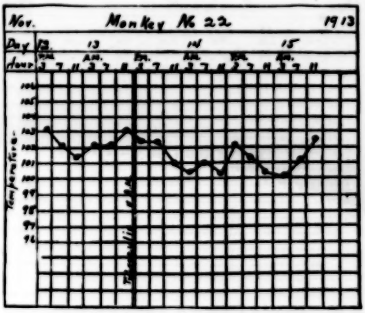

Chart 8.—Temperature chart of Monkey 22.

Inasmuch as 1,000 bacilli of this culture were able to produce infection in calves 3 weeks old, the amounts given were entirely too large and the increase in dosage far too rapid. Only one calf, Calf 3, had clinical tuberculosis, calcified tubercles were found in two, and still another gave no microscopic evidences of tuberculosis.

The fact that calves 7 and 8 apparently overcame completely the mild infection produced is of interest.

The Barber technic has been of great service in studying the effect of subcutaneous inoculation of minute doses of tubercle bacilli. In the infection of human beings by Nature it has been thought that the bacilli can pass through mucous membranes without the production of a local lesion. In the usual laboratory studies a local lesion following subcutaneous inoculation has been regarded as a sine qua non, and an infection of neighboring glands has been predicated.

In a series of guinea-pigs inoculated with minute (from 10 to 60 tubercle bacilli) infective doses sub-

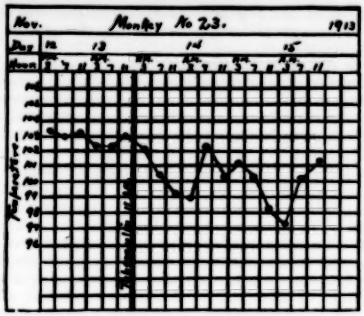

Chart 9.—Temperature chart of Monkey 23.

cutaneously, we have frequently observed the absence of a local lesion, but practically never have failed to find the local glands infected as the following specify:

1. Glands infected but no local lesion, fifty-five guinea-pigs.
2. Glands infected and local lesions, twenty-five guinea-pigs.
3. No glands infected or local lesion, but splenic infection, two guinea-pigs. (These, however, had platelets added to the bacilli.)
4. Failed to become infected, five guinea-pigs.

Our experience with both the intradermal and subcutaneous tuberculin diagnostic tests in monkeys has been rather uncertain and decidedly unsatisfactory. Monkey 6 gave repeated negative results to varying amounts of O. T. given intradermally, and then died with extensive, scattered tuberculosis.

Monkeys 8, 10 and 11 gave positive reactions to 20 mg. O. T. given intradermally, but complete necropsies failed to show any tuberculosis. No rise of temperature after the subcutaneous inoculation of tuberculin has been observed. Interference with the normal night drop has occurred rather frequently, as in Monkeys 9 and 12 when the necropsies were completely negative and in Monkey 20, when a small amount of tuberculosis was found at necropsy. Certainly repeated tests would seem necessary to decide whether or not a monkey had been infected.

In our report[4] on immunity in tuberculosis in 1911, mention was made of two children inoculated with Culture B.

The children to-day (June 11, 1914), are negative to the von Pirquet reaction, using 100 per cent. O. T. Five other children were later reported on, but Culture B, which was employed, was found to have become avirulent, 200,000 bacili of this culture failing to infect guinea-pigs.

One of these children (L), however, was so badly exposed, living in a three-room house with an inebriate consumptive in the last stages, that an effort was made to immunize if possible with a more virulent culture. At that time the graded inoculation of this culture (Brown C_4) had not infected a guinea-pig. The child was inoculated beginning Jan. 20, 1913, at seven-day intervals with 2, 3, 5, 7, 10 and 12 bacilli, respectively. Immediately previous to the inoculations a von Pirquet test was doubtful or negative.

March 1, 1913: A slight nodule observed on right forearm at site of a former inoculation. This nodule was at first mistaken for a staphylococcus infection.

March 10, 1913: Foregoing nodule larger. A second smaller nodule 2 inches distant, and a very minute nodule on left forearm.

March 11, 1913: These three nodules removed under chloroform anesthesia. The section of larger nodule showed numerous bacilli.

March 18, 1913: A gland noticed in right axilla enlarged. Removed.

June 14, 1914: Temperature taken through four months remained constantly normal. Child in perfect health. No evidence of glandular enlargement anywhere. Platelets, 396,000. Lymphocytes, 50 per cent. Von Pirquet tuberculin test positive.

BLOOD-PLATELETS AND TUBERCULOSIS

It has for a long time been observed that blood-platelets are increased in tuberculous infection. Osler, however, has written a scathing rebuke to the tyro who every little while claims to recognize tuberculous infection by increase of these blood elements. It seemed wise to try and investigate why Nature increases these so-called third corpuscles, knowing how rarely if ever she operates without a purpose. We have published elsewhere[5] the following results of our observations.

1. Blood-platelets are increased in the tuberculosis of man and guinea-pigs.
2. Blood-platelets added to a small infective dose of virulent tubercle bacilli appear to modify the infection when injected into guinea-pigs.

In addition we have observed that blood-platelets are increased 12 per cent. in the blood of man and guinea-pigs at an altitude of 6,000 feet. They are also increased by hyperemia of the marrow of long bones and in poisoning by carbon monoxid.

The increase of blood-platelets in the infected Monkey 21 occurred two weeks after the inoculation of virulent tubercle bacilli, and was maintained. The number in the control animal, Monkey 23, remained consistently normal, and post-mortem examinations gave evidence that the findings had been correct.

CONCLUSIONS

1. Guinea-pigs can probably not be immunized with virulent human tubercle bacilli of cultures from which ten bacilli can cause infection.
2. The minimum lethal dose of different virulent cultures would appear to vary in number.
3. The minimum lethal dose for a *Macacus rhesus* is possibly a little larger than that for a guinea-pig.
4. It is necessary to be guided by the virulence of human tubercle bacilli as tested in the guinea-pig before the application to children.
5. After four years two children each inoculated up to five times the lethal dose for a guinea-pig are still negative to the von Pirquet reaction.

5. Webb, Gilbert and Havens: Colorado Med., January, 1914; Trans. Tenth Annual Meeting Nat. Assn. for Study and Prevention of Tuberculosis.

6. In monkeys the decrease of lymphocytes as indicated in differential blood-counts would appear to be more reliable in indicating tubercle infection than the tuberculin tests.

7. Less than ten virulent human tubercle bacilli can infect a child.

ABSTRACT OF DISCUSSION

Dr. William Ophüls, San Francisco: What were the anatomic findings in the monkeys that were so infected? Using these very small doses of tubercle bacilli for the infection, one approximates, I presume, the natural infection more closely.

Dr. G. B. Webb, Colorado Springs, Colo.: No observations were made on the tuberculous monkeys except as stated in my paper. We usually killed the monkeys immediately infection was recognized, as indicated either by a local lesion or glandular swelling.

LYMPHOCYTOSIS AS A SIGN OF CONSTITUTIONAL DERANGEMENT IN CHRONIC DISEASES OF THE DIGESTIVE TRACT*

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NEW YORK

Of an extensive literature devoted to the rôle which constitutional factors play in the development of disease, only a small part deals with the digestive tract. In the discussion of gastro-intestinal diseases the local anatomic aspect dominates the conception of the morbid state. This conception is principally based on the demonstration of anatomic lesions at abdominal operations, which undoubtedly in many instances cleared up the true nature of a formerly obscure process. This applies, however, in particular to acute diseases; we cannot say as unreservedly that the demonstration of anatomic lesions has satisfactorily cleared up the pathogenesis of chronic diseases of the alimentary tract. In most of these chronic diseases anatomic lesions usually are the end-results of a pathologic process, but they do not necessarily indicate its working. For the understanding of its development, pathologic physiology promises better information than anatomic facts. It becomes more and more clear that disturbances of function are the causative factors of pathologic conditions in the alimentary tract: the irritative and the depressive disorders of motility and of secretion, spasm and atony, and increased and diminished secretion of the various digestive glands. When I discussed this topic last year,[1] I pointed out the necessity for studying the conditions which provoke the disorders of function. In this paper I intend to show that a general constitutional derangement very often forms the basis for the development of functional disturbances.

It has been demonstrated that the vagus and the splanchnic influence the activity of the digestive organs, although we know comparatively little of the way in which the functioning of these opposing nervous apparatus is physiologically regulated. On the other hand, we have learned to recognize pathologic states or irritation of both nervous systems, the "vagotonia" and "sympathicotonia" of Eppinger and Hess.[2] Since these authors first differentiated the two conditions, other investigators have pointed out[3] that often there are in a given case as many vagotonic as sympathicotonic symptoms, so that the sharp lines between the two states as originally drawn by Eppinger and Hess should be modified. Aside from this the inauguration of visceral neurology marks a decided progress. The knowledge of chronic vagus irritation has thrown considerable light on the pathogenesis of gastric ulcer, and one may expect that further investigation of the vegetative nervous system will clear up many unexplained points in the diseases of the digestive tract.

For the present discussion I wish to call attention to the fact that patients with vagotonic or sympathicotonic symptoms at the same time very often present signs of disordered internal secretions. The relation between disturbances of the ductless glands and those of the vegetative nervous system has not been safely established. Two years ago Dr. Cannon[4] pointed out the possibility that the glands of internal secretion play a rôle in causing disturbances in the nervous system of the alimentary canal. Dr. Cannon's work deals especially with the effect of excessive secretion of the adrenals, which affects the alimentary canal precisely as splanchnic impulses affect it, by producing a total abolition of tone and a consequent inhibition of all activity.

There is much in the clinical picture of patients with chronic gastro-intestinal diseases which strongly suggests that the influence of disordered internal secretions, in particular of the thyroid gland, is frequently the primary factor which causes the derangement of the visceral nerves. Knowing the importance placed on lymphocytosis in disordered thyroid, I have tried to find out whether blood examinations would offer a firmer basis for such a conception. I have examined 140 patients who presented the different types of chronic functional and organic gastro-intestinal diseases, from plain constipation to gastric ulcer, combined with more or less numerous signs of vagus—or sympathetic irritation. I have purposely abstained from any attempt at classification. The point which I want to emphasize is the remarkable frequency of lymphocytosis which I have encountered in this series of cases.

In my classification of lymphocytosis I considered:

1. As normal a total of 10,000 white cells or less with a differential lymphocyte count up to 35 per cent.

2. As relative lymphocytosis a total white-cell count below 10,000 with a differential lymphocyte count above 35 per cent.

3. As absolute lymphocytosis a total white-cell count above 10,000 with a differential lymphocyte count above 35 per cent.

In the differential classification of lymphocytosis mononuclears and all transitional forms were excluded, while the small and the large lymphocytes counted together were given as lymphocyte percentage.

* President's address, read at the Seventeenth Annual Meeting of the American Gastro-Enterological Association at Atlantic City, N. J., June 22, 1914.

1. Kaufmann, Jacob: The Part Played by Functional Disorders in the Pathology of the Stomach, The Journal A. M. A., July 26, 1913, p. 251.

2. Eppinger and Hess: Die Vagotonie, Von Noorden's Samml. klin. Abhandl., 9 and 10.

3. For fuller information regarding these questions see: Hemmeter: New York Med. Jour., 1914, p. 101. Wolfsohn, J. M.: The Normal and Pathologic Physiology of the Visceral Nervous System, The Journal A. M. A., May 16, 1914, p. 1535.

4. Cannon: President's Address. Tr. Am. Gastro-Enterol. Assn., 1912, p. 10.

Of the 140 cases examined, 43 showed a normal lymphocyte count; 7 were on the border line; 16 showed absolute lymphocytosis, and 74 showed relative lymphocytosis. Of the latter 11 showed leukopenia, that is, a total white-cell count below 6,000, downward to 3,200.

Of the total number of 90 cases of lymphocytosis (16 absolute and 74 relative):

From 35 to 40 per cent. of lymphocytes were shown by 27.
From 41 to 45 per cent. of lymphocytes were shown by 18.
From 46 to 50 per cent. of lymphocytes were shown by 20.
From 51 to 55 per cent. of lymphocytes were shown by 20.
From 56 to 62 per cent. of lymphocytes were shown by 5.

The ninety cases of lymphocytosis represent 60 per cent. of all cases examined. Since a number of these patients reported only for mild temporary disorders and were examined as a routine, the 60 per cent of cases showing relative or absolute lymphocytosis must be considered very high.

The question is, What does lymphocytosis indicate? The examination of my patients soon made me realize that lymphocytosis is by no means as reliable a sign of exophthalmic goiter as it was formerly considered. Only a few of my patients presented symptoms which could be interpreted as caused by hyperthyroidism. I then found from the literature that during the last few years a different meaning had been given to lymphocytosis. Kocher's clinic, as Pettavel's[5] recent publication shows, still adheres to the original conception of lymphocytosis as a direct result of hyperthyroidism. This view, however, has been challenged by a number of writers. Borchardt,[6] Falta,[7] and Maranon[8] were among the first to point out that lymphocytosis is observed not only in hyperthyroidism but also in hypothyroidism, and, further, in disturbances of the other ductless glands such as the hypophysis, the adrenals, etc. These authors assert that the ductless-gland disorder is the primary disturbance, which in turn produces status lymphaticus, and they consider the lymphocytosis as a manifestation of status lymphaticus.

The linking of lymphocytosis and status lymphaticus has complicated matters so far as one forgets that we are dealing here with two distinctly different problems; first, with the relation of lymphocytosis and ductless-gland disorders, and second, with that of lymphocytosis and status lymphaticus. The definition of status lymphaticus is anything but clear. In literature we often find the diagnosis status lymphaticus merely based on the findings of blood-lymphocytosis, without any reference to the fact that these cases presented the hypertrophy of the lymphatic tissues or any of the other anatomic features, which Paltauf, and after him Kolisko, Bartel and Neusser have given as the main criterion of status lymphaticus.[9] A good deal of confusion might be avoided if we followed Bartel,[10] who proposed to confine the term "status lymphaticus" to the group of cases which are anatomically well defined by hypertrophy of the lymphatic tissues, and differentiated this group from what he calls status hypoplasticus, which in a less restricted and broader conception denotes a general constitutional inferiority with more or less marked hypoplasia in various organs and with lymphatic systems which, although not hypertrophic, nevertheless show abnormalities. If we accept this differentiation it must be stated that according to Siess and Stoerck,[11] no lymphocytosis is found in true status lymphaticus, so that there is no justification for regarding lymphocytosis as an indication of status lymphaticus, as is done by most writers at present. If the findings of Siess and Stoerck are corroborated it must be declared an error to diagnose status lymphaticus merely because lymphocytosis is present. On the other hand, lymphocytosis is very frequently found in cases which answer Bartel's description of status hypoplasticus or whatever one may call this condition of general constitutional inferiority. Kahler[12] pointed out that lymphocytosis may be considered in a more general way as a manifestation of that constitutional derangement which in literature is differently described as lymphatism, lymphatic constitution, status hypoplasticus, general congenital asthenia, morbus asthenicus, infantilism, etc. This constitutional derangement is met very frequently. It may give rise to disturbances in various systems, a fact which accounts for the demonstration of lymphocytosis in so many different conditions. To quote only a few of a great number of publications: Von Hösslin[13] and Sauer[14] report the frequency of this blood-picture in all functional disorders of the nervous system which such patients are particularly prone to develop. Gudzent[15] found lymphocytosis in chronic arthritis, so frequently associated with status hypoplasticus; Mohr[16] in constitutional obesity, and Decastello[17] in tuberculosis. The correlation of lymphocytosis and status asthenicus as developmental anomalies and predisposing factors for tuberculosis have often been discussed, lately by Bartel and Kraus.[18]

In the majority of my cases with lymphocytosis I noted a more or less pronounced tendency to asthenia or other manifestations of status hypoplasticus.

If it is permitted to conclude from all these findings that lymphocytosis may be taken as an indication of status hypoplasticus, the figures in my series certainly show that this constitutional derangement frequently forms a basis for the development of diseases in the digestive tract.

I have to come back once more to the question, What relation exists between lymphocytosis and disordered internal secretions? I quoted above the opinion of Kocher and others, who consider the blood-picture as secondary to the ductless-gland disorder. So far there is little proof for this contention and much may be said against it. In the first place it is difficult to understand how, as Borchardt and Falta assert, the same blood-picture should be produced by entirely different ductless-gland disorders—by decreased as well as increased thyroid secretion. I further call attention to Kocher's own reports which show that lymphocytosis remained unchanged in cer-

5. Pettavel: Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1914, xxv, 748.
6. Borchardt, L.: Deutsch. Arch. f. klin. Med., 1912, cvi, 182.
7. Falta, W.: Deutsch. Arch. f. klin. Med., 1912, cvii, 103.
8. Maranon, G.: Boletin de la Sociedad Española de biologia, 1911, v, 75, ref. Centralbl. d. exper. Med., 1912, ii, 158.
9. A very clear description of the physical characteristics of status lymphaticus is given by Haven Emerson in the Archives of Internal Medicine, January, 1914, p. 169.
10. Bartel: Status thymico-lymphaticus und Status hypoplasticus, Leipsic and Vienna, Franz. Deuticke, 1912.
11. Siess and Stoerck: Wien. med. Wchnschr., 1913, No. 8.
12. Kahler, H.: Ztschr. f. angew. Anat. u. Konstitutionslehre, 1913, I, 139.
13. Von Hosslin: München. med. Wchnschr., 1913, Nos. 21 and 22.
14. Sauer, Hans: Deutsch. Ztschr. fr. Nervenh., 1913, xlix, 447.
15. Gudzent: Deutsch. med. Wchnschr., 1913, p. 887.
16. Mohr: Verhandl. Cong. f. inn. Med., 1914.
17. Decastello: Wien. med. Wchnschr., 1914, p. 669.
18. Kraus, F.: Deutsch. med. Wchnschr., 1913, p. 194.

tain cases of exophthalmic goiter after the overactivity of the gland was successfully checked by operative treatment. This suggests that lymphocytosis is an indication of some factor other than hyperthyroidism.

In his monograph on status lymphaticus, Neusser[19] suggests the possibility that the lymphatic tissues produce a secretion which acts as the antagonist of epinephrin, and that abnormal lymphatic tissues may cause a disturbance of this secretion, which in turn upsets the activity of the other ductless glands. More light will have to be thrown on this problem before we can speak of a causal relation. Until then it seems safer merely to record that lymphocytosis and ductless-gland disorders are frequently associated, or, to express it differently, that persons with status hypoplasticus are inclined to disorders of internal secretions. It seems that they are particularly predisposed to thyroid insufficiency, possibly on account of fatigue when more demands are made on them than their constitutional derangement permits them to bear.

In my series of cases, symptoms of thyroid insufficiency were decidedly predominant. I wish to mention here that in 1907 Dr. Sawyer[20] discussed the frequent relation of digestive disorders and thyroid disturbances and reported diagnostic blood-pictures. Dr. Sawyer designated his cases as incomplete forms of exophthalmic goiter. Most of my own cases presented symptoms which, according to the teaching of Hertoghe, Levi and Rothschild, Saenger and others, are the result of the thyroid insufficiency, so that instead of *formes frustes* of Graves, one should speak of *formes frustes* of myxedema, or as others have called it, of chronic benign hypothyroidism. The correct interpretation of the thyroid disorder is important for purposes of treatment. It is true that we should not differentiate too sharply, since it is known that overactivity as well as insufficiency of the thyroid may at different times occur in the same patient; and then, too, it is becoming more and more evident that thyroid disorders are rarely observed alone, but that as a rule they are combined with other ductless-gland disorders; yet there can be no doubt that in most cases one type of disorder is distinctly preponderant.

Of the signs attributed to hypothyroidism observed in my patients the most frequent symptoms pointing to retarded metabolism were: congestion of the liver associated with bilious attacks, headaches and migraine; tendency to fatigue, lack of ambition, mental depression, low blood-pressure, impaired circulation and cold extremities. In most of these cases a small thyroid gland was found which permitted palpation of the tracheal rings down to the sternum. Of the symptoms referable to the alimentary canal, I mention atony of the stomach and intestines with constipation and congestion of the mucous membranes causing a tendency to chronic inflammatory processes; when associated with symptoms of vagotonia, irritative disorders of the stomach, hyperacidity and hypersecretion, spastic conditions in various parts of the digestive tract from the esophagus down to the anus with all its sequelae, gastric ulcer, spastic constipation, mucous colitis, adhesions following inflammatory processes in the various organs and their mechanical results.

I wish to state that I observed some cases with symptoms of hypothyroidism in the digestive tract as well as in other organs which showed no lymphocytosis, although their number was small as compared with the number which presented lymphocytoses.

In a number of cases presenting symptoms of hypothyroidism I had excellent results from the administration of thyroid. This was particularly instructive in cases of children suffering from malnutrition who were subject to gastric atony, constipation, congestion of the liver, headaches, etc., and who were freed of these disorders by thyroid medication. I observed cases of gastric hyperchlorhydria which had stubbornly resisted all other methods of treatment, and which then were relieved by taking thyroid. The same beneficial effect of thyroid therapy was experienced in other gastro-intestinal disorders when they were associated with chronic benign hypothyroidism.

I shall not discuss any further ductless-gland disorders and thyroid therapy, and I shall be very careful not to generalize. The report of successful thyroid treatment in my cases was merely meant to show that there are possibilties of causative treatment once we recognize the constitutional derangement and the disorders which it leads to. But valuable as such more specific forms of treatment are, there is a more important lesson to be learned from the present discussion; and this is, that the constitutional factor which I so often found at the bottom of chronic gastro-intestinal disorders should be given full consideration in the general management of such patients.

The periodicity which characterizes most chronic digestive disorders indicates that general conditions, such as constitutional derangements, are the decisive factors in the development of the disorder and not the anatomic lesions which are end-results. This is particularly evident in gastric-ulcer cases; and whether when treating them we shall succeed in avoiding recurrences will not depend so much on the employment of any special form of ulcer treatment, and in operative cases not on improved technic or new methods of operation, but it will depend to a much greater extent on our ability to regulate the patient's mode of living and on the patient's ability to observe general hygienic and dietetic principles and rules, which consider not only his local disorder, but in the broadest possible way his constitutional make-up, his mental state, his work, his habits, etc.

We are fully familiar with such conceptions for other diseases. It is generally understood that epilepsy develops on the basis of a constitutional disposition, and that this disposition must constantly be the object of treatment no matter whether the individual attacks are provoked by constipation, by the irritation of scar tissue, or from any other cause. There is no difference of opinion regarding the necessity of persistent hygienic and dietetic treatment in tuberculosis, if we want to succeed in fighting the ravages of the tubercle bacilli; and this is precisely the same situation which confronts us in many chronic gastro-intestinal disorders. We must emancipate ourselves from the narrow view which considers only the local disorder, be it ever so pronounced, and take into account the fact that a constitutional derangement is often the basis for the development of most of these local disorders, and that this constitutional derangement necessitates as persistent general treatment as it does in epilepsy, tuberculosis and other diseases. I hope that I have made this clear.

52 East Fifty-Eighth Street.

19. Neusser: Zur Diagnose des Status Thymico-Lymphaticus, Vienna and Leipsic, W. Braumüller, 1911.
20. Sawyer: New York Med. Jour., July 15, 1907.

THE SPECIFIC ACTION OF SALICYLATES IN ACUTE ARTICULAR RHEUMATISM*

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Maclagan in 1874 was apparently the first physician to ascribe to salicylates a specific action in the treatment of acute articular rheumatism, although in the discussion following his report an English army surgeon in South Africa related that a decoction of willow bark was a favorite remedy among the Hottentots in the treatment of painful joints. His use of the remedy was purely empirical. He believed, on account of the profuse perspiration, that rheumatism was closely related to malaria; that in certain regions where malaria is prevalent the cinchona grows and that, therefore, in local surroundings especially favorable for the development of rheumatism, search should be made for a specific. As dampness predisposes to rheumatism, the search was begun among those plants growing in low grounds; early he examined the willow, and from this obtained the salicin, which he hailed as a specific.

The following year (1875) Buss and Riess,[1] and also Stricker[2] apparently independently of Maclagan recommended, on account of its antiseptic power, salicylic acid. Senator in 1876, also independently of Maclagan, recommended salicin, as, according to Ranke, Lehman and others, it was converted into salicylic acid in the stomach. The introduction of salicylic acid at this particular time can be accounted for by the introduction in 1874 of Kolbe's process of manufacturing it. Although salicylic acid was first made by Pagenstecher in 1835, it was not until Kolbe's discovery that it could be produced at a moderate cost.

The use of the salicyl preparation in rheumatism became quite general in both England and Germany during the late seventies, and especially in the English medical journals of that date an interesting discussion was carried on as to whether or not this group of drugs really possessed great therapeutic value in arthritis. On either side of the question could be found some of the best medical men of the day. It is largely from the literature of this period that we can obtain abundant statistical data.

Regarding the supposed method of action, this was considered purely bactericidal, the first preparation used in Germany being salicylic acid, which, as is well known, is a very powerful germicide. It is a general cellular poison, toxic to the cells of the body, and, as far as we know, has no selective action for bacteria. It was overlooked at this time that the salicylic acid on leaving the stomach is converted into a salicylate and appears in the circulation and comes in contact with the tissues in this form. If, therefore, its action is bactericidal, it must be reconverted in the tissues into salicylic acid. Salicylic acid is rapidly and completely eliminated through the kidney chiefly in combination with glycocoll, as salicyluric acid; a very small amount may be excreted as salicylic acid. Inasmuch as drugs may have a selective action for certain tissues, it is possible that this selective action may be manifested by the inflamed joints, and if so there may be conditions present making possible the conversion of the salicylates into the salicylic acid. Fillipi and Nesti have shown that in man two hours after the administration of acetylsalicylic acid a test for salicylate could be obtained from the synovial fluid. Bondi and Jacoby[3] gave rabbits 0.57 gm. of salicylic acid and later determined its presence in the various fluids and tissues of the body. They found much larger amounts in the muscles and joints than in other tissues, and at times it could be demonstrated in the cartilage and synovial membrane and not in other tissues. They did not show, however, in what combination the salicylic acid existed. This is after all the most important point, as the salicylates do not have any germicidal action.

As all the tissues of the body have an alkaline or neutral reaction, the sodium salicylate cannot be converted into salicylic acid in the tissues unless, as Binz[4] has suggested, in the presence of increased carbon dioxid tension. Both Binz and Ewald[5] were able to show that the carbonic acid tension is from 5 to 7 per cent. higher in inflamed tissues than it is in the blood, even in extreme cyanosis, and that the blood in extreme cyanosis is capable of freeing the salicylic acid from its salt. Binz also demonstrated that an alkaline fluid containing sodium salicylate, if impregnated with carbonic acid to the degree found in inflamed tissues, would permit of the breaking up of sodium salicylate, and the setting free of salicylic acid. Although this has not been shown to actually occur in the joints in arthritis, on theoretical grounds it is at least possible.

Previous to the introduction of salicylic acid, acute arthritis was treated by the use of alkalies, heat, counter irritation and venesection. Under these methods, the results of treatment were generally conceded as better than with the expectant method. With the introduction of salicylic acid, there was abundant opportunity for comparative observation of the value of this new therapeutic agent. These observations consisted of statistical collections and personal impressions. It is of interest to note that even at this time the best men in the profession did not consider the drug as a specific in the sense we use this term with quinin or mercury, but rather debated whether this new treatment was superior to the old. On account of the variable duration of the disease, the sudden improvements and relapses, it is extremely difficult to draw accurate conclusions, except by carefully compiled statistics extending over a considerable period of time. Southey[6] most appropriately stated in 1879 at the time when the discussion of the value of salicylates was at its height that "there are few diseases, perhaps, which present more dangerous pitfalls to the unwary and clinically ill informed in therapeutics than rheumatism." Before the use of salicylates, Southey, Gull and Sutton, and others had divided acute articular rheumatism into two groups: one in which the disease ran a short course, the symptoms all subsiding about the eighth or ninth day; a second, relapsing type when about the eighth or ninth day a mitral murmur appeared, and in these cases the apparent recovery was followed by a relapse which might continue for sev-

* Read before the Section on Pharmacology and Therapeutics at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

1. Riess, L.: Nachtrag zur innerlichen Anwendung der Salicylsäure, insbesondere bei den acuten Gelenkrheumatism, Berl. klin. Wchnschr., 1876, xiii, 86.

2. Stricker: Ueber die Resultate der Behandlung der Polyarthritis rheumatica mit Salicylsäure, Berl. klin. Wchnschr., 1876, xiii, 1.

3. Bondi, S. and Jacoby, M.: Ueber die Verteilung der Salicylsäure bei normalen und infizierten Tieren, Beitr. z. chem. Physiol. u. Path., 1906, vii, 514.

4. Binz, C.: Die Einwirkung der Kohlensäure und Salicylsäure Natrium, Arch. f. exper. Path. u. Pharmakol., 1879, x, 147.

5. Ewald, C.: Arch. f. Anat. u. Physiol., 1876, p. 446.

6. Southey, R.: Treatment of Acute Rheumatism by Salicylate of Soda, St. Bartholomews Hosp. Rep., 1879, vi, 7.

eral weeks. These observations are of interest as suggesting the possible importance of endocardial involvement accounting for the relapses and protracted duration.

In considering statistics two points have been observed: the time of disappearance of pain after entering the hospital, and the average period that patients, with and without salicylates, remained in the hospital. These two points were selected, first, because the pain, while purely subjective, yet is so constant that its subsidence may be considered as a fair index of the disappearance of the acute symptoms. On the other hand, relapses are so frequent and moderate tenderness so often persists long after disappearance of the acute pain that the patient's statement must often be considered relative; for this reason the period of time spent in the hospital may be taken as the time required for an actual cure plus the necessary period of convalescence. On account of the antipyretic action of the salicylates, the duration of the febrile period is of little value. In going over the literature all extensive series of cases in which these two points were recorded have been taken; unfortunately from the standpoint of accuracy, the number of observers is small. While both sets of figures are based on the duration of the disease from entrance to the hospital, rather than from the time of actual onset, for comparative purposes this does not impair the result.

Considering the first point—the time at which pain disappeared after entering the hospital—Reihler[7] reports 638 cases with salicylate, average duration of pain being 5.1 days; 425 cases without salicylates, average duration of pain 9.8 days. Pribram[8] reports 541 cases with salicylates, with average duration of pain 6.5 days; 354 without salicylates, average duration of pain 10.4 days. Reisz treated 79 cases with salicylates, the average duration of pain being 5 days, and 124 without salicylates, with average duration of pain 21 days. In all 1,258 patients were treated with salicylates with average duration of pain 5.3 days, 974 without salicylates, average duration 13.4 days. In addition, Hood[9] reports 350 cases, in 80 per cent. of which under salicylate the pain disappeared within 9 days and 311 without salicylates, with disappearance of pain in only 40 per cent. of cases within 9 days.

These statistics show that the duration of pain in the joints is much lessened by the use of salicylates. Still, 30.3 per cent. of those receiving salicylates, but only 6 per cent. of the untreated, have one or more relapses, and this was not considered in the statistics, as the time reported is that of the first disappearance of pain. For this and other reasons, especially the absence of the personal equation, the average period of time the patients remained in the hospital is probably more accurate and of more value.

Fortunately, extensive statistics on the time that patients remained in the hospital previous to and since the introduction of salicylates are available.

Perhaps one of the most striking features of these statistics is the uniformity of the period spent in the hospital. These figures include all the available extensive series except 417 cases given the alkaline treatment by Fuller and reported in 1863, in which the average period in the hospital was 20.1 days. As these figures are so at variance with those reported by others using the same treatment, they have been purposely omitted from the table. At this early period of salicyl therapy the dosage was large; 15 to 20 grains every two to three hours was considered a moderate dose and many gave 300 grains a day. For this reason the criticism cannot be urged of insufficient dosage.

The information to be drawn from these statistics is that the pain and evidence of active inflammation in the joint is controlled at least temporarily by salicylates. On account of relapses and slight joint involvement, the actual complete recovery of the patient has not been materially modified by the use of salicylates. It would appear that the drug shortened the period of local inflammation in the joint, and apparently prevented new joint infection. The generalized infection, however, ran its usual course. This may be due to the bactericidal action of the salicylic acid which is set free owing to the increased carbonic acid tension in the inflamed joint. None of our present theories, however, provide for the presence of free salicylic acid in uninflamed joints, which would be necessary in order to account for failure of new joints to become involved after the use of salicylates. Frequently, however, in spite of the use of salicylates the joint infection continued to recur, either not being affected by the salicylates, or, after being held temporarily in abeyance, again becoming active. Relapses may occur even while the patient is receiving large doses of salicylates; in one report a relapse occurred while the patient was taking daily doses of 13 gm. Miller[10] in a recent review of this subject states that of seventeen relapses, eleven occurred while the patient was still taking salicylates. Five of these were taking daily not to exceed 50 grains, four not to exceed 100 grains; one taking 150 to 200 grains; one taking 200 to 250 grains. These patients were all children and while the ages of these particular patients are not given, judging from references elsewhere in the article, they were probably under 10 years. The temporary improvement with later relapses lead to the view that salicylates were responsible for these. It is probable, however, that in the untreated cases the course of the disease was unmodified, while in those receiving the salicylates temporary lulls occurred in the local manifestation.

PERIOD PATIENT REMAINED IN HOSPITAL WITH AND WITHOUT SALICYLATES

Observer	No. Cases	With, Days	No. Cases	Without, Days
Warner	342	34.9	387	36.2
Pribram	429	29	...	....
Reisz	79	35.8	134	39.2
Badt	158	36	156	34.5
Putnam	455	32.9	353	32.8
Thompson	...	....	147	31.3
Chamberlain	...	....	57	34.7
Dickinson	...	....	131	33.13
Sibert	...	....	57	34.7
Southey	51	32.5	...	....
H. Hall	38	34	16	33
Coupland	84	36	...	....
Finley and Lukas	60	29.7	98	29.4
Owen	156	23	79	36
Russell	55	38	35	39
Total	1,907	....	1,600	....
Average	...	33.28	...	33.6

7. Reihler, M.: Statistische Erhebungen über die Resultate der Behandlung der Polyarthritis rheumatica mit Natron Salicylicum, München. med. Wchnschr., 1886, xxxiii, 368.
8. Pribram, A.: Der acute Gelenkrheumatismus, Vienna, 1899.
9. Hood, D.: Statistics in Connection with the Treatment of Acute Rheumatism by Salicylates, Lancet, London, 1881, ii, 1119.
10. Miller, R.: The "Specific" Use of Salicylates in Acute Rheumatism: A Consideration of Practical Objections, Quart. Jour. Med., July, 1913, p. 319.

It would appear that salicylates are not the only therapeutic measures which affect favorably the acute symptom of rheumatism. High degrees of heat may act in much the same manner, causing the acute pain to disappear, only to return again after the treatment has been discontinued. So accustomed are we to use salicylates freely in all patients with acute arthritis that we are not in a position to judge of its value compared with other forms of treatment. During the past winter, for a period of two months, all acute arthritis patients on my service at Cook County Hospital received sweats and alkalies, but no salicylates; the temporary results were most gratifying. Tenderness and stiffness almost invariably disappeared within a week and the patient reported he was well. Within a week of the time the treatment was discontinued, however, 30 per cent. of these cases relapsed. The results, however, were very interesting, as shown that other agencies than salicylates have a decided favorable action on the acute symptom of acute articular rheumatism.

From the information at hand it would not appear justifiable to refer to the salicylates as a specific in acute articular rheumatism but rather as a drug which modifies the course of the disease, without actually shortening the period of infection.

All authorities agree that salicylates have not lessened the frequency of cardiac complication. Taking Pribram's statistics collected from various sources, 28.8 per cent. of cases receiving salicylates and 23.4 per cent. without salicylates developed cardiac complication.

Regarding the dangers of salicylates, these are confined chiefly to the effect on the kidney. It is very doubtful whether the condition ascribed by Lees to acid intoxication was really due to the drug, but rather to the intoxication from the disease. We have evidence from several sources that salicylates irritate the kidney and may excite a mild nephritis: Klieneberger and Oxenius,[11] Luthje, Frey and Glaesgen.[12] The disturbance, however, is temporary and soon subsides even though the salicylates be continued. According to Frey, the kidney irritation can be largely avoided by the use of alkalies. Gastric disturbances are common but not of a serious character, as they promptly subside when the drug is discontinued. Large doses at times may produce symptoms of collapse with slowing of the pulse and respiration. Seiler reports the death of a 7-year-old child after 5 gm. of sodium salicylate; Hogg, a death after two doses of 2 gm. each; Gubler, one after 10 gm.; Goodhart, one after doses totaling 3.6 gm. Quincke reports a death, in which the predominant symptom was dyspnea, after a three days' daily dose of 12 gm.

Since it has been possible to obtain cultures of a streptococcus from the joints of men with acute articular rheumatism, it might be thought possible to determine the effect of salicylates by a bacteriologic study of the joint contents. This is apparently impossible on account of the very transient presence of the germ in the affected joint. Rosenow has found that the micro-organism can be obtained only when cultures are made within a few hours after the appearance of the joint involvement. There remains the field of animal experiments, as joint involvement analogous to the acute articular rheumatism of man can be produced in rabbits by intravenous injection of the streptococcus obtained from the joints of man. Rabbits might be infected and one group then given salicylates and the remainder used as controls. Cultures could be made from the joints at frequent intervals to determine whether the micro-organisms are less abundant or disappear more rapidly in the treated animal. Here again the inconstancy of positive cultures and the difficulty of obtaining sufficient fluid from the joint to make a culture render this method unsatisfactory. Furthermore, frequent puncture of the joint is liable to lead to secondary pus infection. Another method of procedure is to place the animal under salicylates before the inoculation and determine whether this has any effect on the rabbit's susceptibility to joint involvement. If the salicylates act through their germicidal properties, it should be manifested in an experiment of this character.

Young rabbits were selected, as they are much more susceptible to joint infection. The salicylate in 5-grain daily doses was given subcutaneously. This dosage is not excessive, being equivalent to about 250 grains in man. It is true that this was given in a single dose, but none of the rabbits showed any immediate ill effects. Two series of six rabbits each have up to the present time been submitted to this test by Dr. D. J. Davis. In one series a streptococcus was obtained from the tonsils of a patient with acute arthritis; a second series was inoculated with a culture obtained by Dr. Rosenow directly from the joint of a patient with acute arthritis. In each series three rabbits received the salicylate for several days preceding and for a week or more following the inoculation. The other three rabbits did not receive salicylates. The six rabbits received simultaneously an intravenous injection of streptococci. The animals were then examined daily, the number and extent of joint involvement noted, and after the lapse of a week the animals were killed; the involved joints opened and examined. The two series of six rabbits each submitted to this test did not show that the salicylates had any effect either in preventing joint involvement, or modifying the intensity of the same. At a later date when this work is completed it will be published in detail.

SUMMARY

As salicylic acid after absorption circulates and appears in the tissues as a salicylate, it cannot act as a germicide unless the increased carbonic acid tension in the joint, the result of inflammation, reconverts it into salicylic acid. Statistics show that patients receiving salicylate are free from pain much earlier than those not treated. As the treated patients much more frequently relapse than the untreated, however, the total duration of pain in the treated and untreated patients may not be materially different. The period of stay in the hospital of patients receiving salicylate and of those receiving other forms of treatment is the same. Cardiac complications are not less frequent since the use of salicylates. In rabbits the prophylactic use of salicylate is of no value in preventing arthritis after intravenous injections of hemolytic streptococci.

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11. Klieneberger and Oxenius: Ueber Urine und Urinsedimente bei normalen Personen, bei rheumatischer Erkrankungen und nach der Einwirkung von Salicylpräparaten, Deutsch. Arch. f. klin. Med., 1904, lxxx, 225.

12. Glaesgen: Ueber Nierenreizung durch Salicylpräparaten und ihre Aufhebung durch Alkalizufuhre, München. med. Wchnschr., 1911, lviii, 1125.

ABSTRACT OF DISCUSSION

DR. WARREN COLEMAN, New York: My experience with salicylates in acute rheumatic fever is not in accordance with what would appear from Dr. Miller's analysis of cases. Has Dr. Miller considered the size of the doses which were used in certain cases? Some years ago a paper by Lees appeared in the *British Medical Journal*. His treatment of rheumatic fever with the salicylates differed materially from any which I had seen described. He recommended the use of salicylate up to 500 or 600 grains a day. I continued, however, to use 20 grains of a salicylate every two hours and 40 grains of sodium bicarbonate until recently, when the size of the dose has been increased. I have been greatly gratified by the results. Lees believes that the salicylates are just as specific for this disease as salvarsan is for syphilis or quinin for malaria. While I am not prepared fully to endorse this statement, the symptoms of the disease usually disappear in from twenty-four to thirty-six hours after the administration of the large doses. Lees states that the salicylates should always be combined with twice the quantity of sodium bicarbonate as otherwise a condition resembling acidosis may develop. Another point he makes is that the drug should be discontinued on any day that the patient's bowels do not move.

DR. LAWRENCE LITCHFIELD, Pittsburgh: Has Dr. Miller collected any observations as to the frequency of endocarditis? Krause believed that cases with full salicylic acid treatment showed a smaller percentage of endocarditis; and also in cases of tonsillitis in which rheumatic complications were feared he believed in giving salicylic acid. I know Krause believed in the specificity of salicylates for rheumatism and gave from 0.5 to 1 gm. every hour, day and night, until the patient improved. There was no mention of sodium bicarbonate or acidosis. His convictions must count for something even in the face of these statistics. The question is not whether the patients get salicylates, it is whether they get saturated with them. Krause used salicylic acid in this way and rarely needed to continue it more than twenty-four or, at most, thirty-six hours. When not well borne he gave diplosal, which I have found very satisfactory.

DR. BERNARD FANTUS, Chicago: If I rightly understand the points made by Dr. Miller he did not deny value to salicylates in the treatment of rheumatism. I believe he admitted analgesic value; but the point made is that there was no diminution in the duration of the disease. With both of these propositions I can heartily agree. His statistics show that the salicylates do not seem to have antibacterial action in this disease.

DR. JOSEPH L. MILLER, Chicago: All these statistics were collected between 1876 and 1884. At that time 200 to 300 grains were given daily, so the objection to small doses does not hold good. The only point about Lees' paper which interests me is that relapses will occur and two-thirds of the relapses occur while the patient is taking the salicylates. Relapses, however, are fewer under larger doses than when smaller doses are given. I judge that the salicylates do modify the course of the disease just the same as sweats and heat modify it. The fact that the symptoms return after the stopping of the salicylates is proof of his fact. The duration, however, I believe is not especially modified.

Influence of Arabian Medicine.—The influence of Arabian medicine on modern medicine can, perhaps, best be judged from the number of words in our modern nomenclature, which, though bearing Latin forms, often with suggestion of Greek origins, still are not derived from the old Latin or Greek authors, but represent Arabic terms translated into Latin during the Renaissance period. Hyrtl, without pretence of quoting them all, gives a list of these which is surprising in its comprehensiveness. For instance the mediastinum, the sutura sagittalis, the scrobiculus cordis, the marsupium cordis, the chambers of the heart, the velum palati, the trochanter, the rima glottidis, the fontanelles, the alae of the nose, all have their present names, not from Latin, but from Arabic terms.—Walsh, *Makers of Medicine*.

ARTIFICIAL PNEUMOTHORAX AND PREGNANCY

CASE REPORT

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The case cited below is an interesting example of what the human organism may accomplish with a little help, and a striking example of the efficacy of induced pneumothorax under some very unfavorable circumstances.

History.—Mrs. F. W., aged 24, born in Illinois, was referred to me Jan. 1, 1914. Grandparents on both sides lived to 90 years of age and over. Mother died of pneumonia. Father died of pulmonary tuberculosis at age of 36. Two brothers and five sisters are living and in good health. One sister died of pulmonary tuberculosis at age of 19. Patient had none of the diseases of childhood, but has always been very frail. She married at 20 and gave birth to healthy baby boy two years later. She nursed baby for one month. About this date slight cough and expectoration appeared, and the patient had daily afternoon fever and began to lose weight rapidly. In February, 1912, she had sweats nightly for about one month. Tubercle bacilli were demonstrated in the sputum at this time. From February to August, 1912, treatment consisting of rest, outdoor living and forced feeding was tried in Illinois without material gain. In August, 1912, a change to Colorado was advised. Patient entered a sanatorium in Colorado Springs and remained there ten months. Fever gradually declined so that by the end of the third week in the sanatorium, temperature was normal and remained so for over ten months. During the first four months patient gained 22 pounds. Patient left sanatorium in June, 1913, 25 pounds heavier, pulse and temperature at a normal level, but still coughing and raising slightly in the morning. On leaving sanatorium she took up housekeeping, doing almost the entire house work. In August, 1913, she became pregnant. In September cough and expectoration increased considerably and afternoon fever of 100 reappeared. During November and December she lost strength and weight very rapidly, and had afternoon fever ranging from 101 and 102.5 at this period.

Examination and Treatment.—Jan. 1, 1914, patient was referred to me for examination and the performance of artificial pneumothorax if advisable. Physical examination showed a poorly developed and emaciated body. The left lung disclosed signs of active trouble from apex to base. Right lung was apparently clear. Temperature was 101, pulse 110. Artificial pneumothorax was advised

January 15, temperature at 11 a. m. was 99.6, pulse 112. At 8 p. m., temperature 101.5, pulse 120. Urinalysis: Specific gravity 1.020; no albumin or sugar; no casts.

January 16, the first injection, 900 c.c. gas, was given at 11 a. m. Temperature at 2 p. m. was 101, at 4 p. m. 101.6, at 8 p. m. 101.8. Pulse from 110 to 120. There was considerable pain and no sleep the first night, with abundant expectoration.

January 17, temperature at 8 a. m. was 98.2, 12 m. 99.2, 4 p. m. 99.6, 8 p. m. 100.2, pulse from 100 to 120. Expectoration was considerably less.

January 18, temperature at 8 a. m. was 98, 12 m. 98.8, 4 p. m. 98.6, 8 p. m. 98.6. Pulse from 100 to 110. There was very little expectoration after morning clearing out. On the morning of the 18th a second injection of 400 c.c. was given. Temperature remained normal from this date until two weeks before labor. Pulse ranged from 80 to 86. During this period patient gained rapidly in strength and 15 pounds in weight; cough and expectoration ceased entirely. The injections of gas were continued at regular intervals during the pregnancy.

Two weeks before labor patient had afternoon fever of from 99 to 100. Urinalysis at this date revealed a specific gravity of 1.032; albumin, trace; no sugar; no casts. Fever

continued until two weeks after labor, after which temperature gradually dropped to normal, pulse ranging from 80 to 90, which conditions have existed without variation up to present date. No cough or expectoration. Labor occurred April 29, 1914, was of seven hours' duration and normal in every respect. One hypodermic injection of pituitary extract was administered fifteen minutes before delivery of head.

Recovery was uneventful. Temperature became normal two weeks after confinement, and at the end of the third week patient was able to be wheeled out in chair. Six weeks from date of labor patient was up and out and apparently well in every respect. Gas injections are still being administered at regular intervals.

In my experience with artificial pneumothorax, now numbering over sixty cases, I have had but one case of pregnancy in the series, from which one cannot draw conclusions. I simply wish to add this testimony to other data now in the process of collection, from which some conclusions may be drawn at a later date.

INTESTINAL STASIS

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The term "intestinal stasis" originated with Sir Arbuthnot Lane. The chronic variety of intestinal stasis this eminent surgeon[1] defines as follows:

> Such an abnormal delay in the passage of the intestinal contents through a portion or portions of the gastro-intestinal tract as results in the absorption into the circulation of a greater quantity of toxic or poisonous materials than can be treated effectually by the organs whose function it is to correct them into products as innocuous as possible to the tissues of the body.

The main cause for chronic intestinal stasis Lane attributes to visceroptosis and formation of kinks. Bainbridge,[2] one of Lane's most ardent followers, says:

> The natural outcome of this kinking of any portion of the drainage tube is obstruction of the lumen of the intestine at the point of the kink with "puddling" in the dependent portion, damming back and infection of the contents, and general slowing of the drainage of the canal.

The symptoms are briefly, headaches, nausea with vomiting, anorexia, loss of weight, cold extremities, mental apathy, constipation, bad taste in mouth, abdominal distention, muscular pains.

The diagnosis is based on the discovery of existing visceroptosis or intestinal kinks (which are best demonstrated by Roentgen rays), in conjunction with a delay in the intestinal prochoresis. For the recognition of the latter Patterson uses the charcoal test. He gives two teaspoonfuls of charcoal and gauges the time of its appearance in the stool. If charcoal does not appear within sixty hours, there is intestinal stasis.

The treatment consists, in mild cases, in an appropriate abdominal support and the administration of liquid paraffin, and in severer cases, in ileocolostomy (short circuiting the bowel) or colectomy.

This, in short, is a brief résumé of Sir Arbuthnot Lane's teaching.

This subject is not a mere theoretical one but presents issues of great practical importance, dealing sometimes with situations endangering life.

I feel forced, therefore, to lay my views, which are quite contrary to Sir Arbuthnot Lane, before the profession.

I would like to mention first that visceroptosis giving rise to intestinal angulations (designated as "kinks" by Lane, and the formation of partial stenoses with delayed prochoresis, originated with F. Glénard. Whatever credit be due for this conception, it belongs to Glénard and not to Lane.

The second point, that of intestinal stasis leading to the absorption of poisons within the intestine, or auto-intoxication, is a theory which was advanced long ago, principally by French clinicians, Bouchard, Combe, and others. This theory has been made by Lane and his disciples the foundation for their plan of treatment. The digestive canal is called a "drainage tube" and compared to a sewer system, in which any clogging must cause disaster.

For our own satisfaction let me say that our organism is not so poor an engine as it is depicted by the adherents of the "stasis" theory. If our body is resourceful, as you all well know, in adequately fighting enemies that it has never before encountered—pneumonia, typhoid fever, etc.—how much more must we expect from it in the way of every-day defenses. It is surely well fitted to debar the entrance of harmful digestive products through the intestinal wall, for this is a continuous happening.

Unless there is a real mechanical obstruction or some substantial organic lesion interfering with the intestinal current, a temporary delay or stasis of the contents may not mean much. At times this delayed prochoresis may serve to make absorption more complete, and is encountered in instances of insufficient nutrition.

Now a word with regard to the auto-intoxication theory, as far as it concerns intestinal stasis or habitual constipation (for this is only another name for it). Constipation does not cause auto-intoxication. For, occasionally, a patient may have no bowel movement for several days and present no abnormal symptoms whatever. The symptoms frequently associated with chronic constipation may be ascribed to nervous disturbances, and not to auto-intoxication. Reassurance and nerve sedatives will often do more good than drastic measures.

We now come to the last point, namely, that of treatment. In mild cases Lane, following Glénard, recommends an appropriate abdominal supporting bandage. To this I fully agree. In the severer type Lane recommends operative measures; ileocolostomy or colectomy. With this radical plan of treatment most clinicians and some eminent surgeons do not agree.

If we did not need the colon, which is an organ of considerable length, we would not have it, or it would show decided signs of degeneration; but this is not the case.

Ileocolostomy, or colectomy, is justifiable in cases of cancer or stricture of the bowel, but not in functional disturbances. Albu[3] has shown that while it is possible to exist without a colon, an individual deprived of this organ is subject to great dangers and easily succumbs to intestinal diseases with which an ordinary person can cope without difficulty.

In addition, there are the dangers of the operation, and ultimately the uncertainty of a cure after exclusion or removal of the colon.

1. Lane, W. A.: Surg., Gynec. and Obst., November, 1910.
2. Bainbridge, W. S.: A Contribution to the Study of Chronic Intestinal Stasis, Med. Rec., New York, Sept. 27, 1913.
3. Albu, A.: Versuche über Ausschaltung des Dünn- und Dickdarms, Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1909, xix, Part 5, p. 852.

Therapeutics

PREVENTION GREATER THAN CURE

LIFE PROBLEMS

The "survival of the fittest" begins with the germ of reproduction, goes through embryonic life, through parturition, through infant life, through childhood, and presumably should be considered as ultimately satisfied at 20 years of age, but it is not perfectly satisfied until another individual emanating from this "fit" individual of 20 years or more has also reached the age of 20. Such, theoretically, may be considered the "survival of the fittest."

It is the object of this series of articles to cause medical men to review the knowledge already acquired of the means and methods of causing more "fit" to be born, and more "fit" to survive and have their health unimpaired by preventable disease.

To show how lavishly nature provides at the start for the survival of the fittest, it should be noted that each human male having normal sexual health and living until the age of 60 is said to produce more than 300 billions of spermatozoa, while the ovaries of the human female are said at puberty to contain about 30,000 eggs. This is not to suggest that the world would be happier with an enormous increase of individuals, but it will be happier, and there will be less poverty, if there are more normal individuals and fewer abnormal ones. The economic value of wars and plagues need not be discussed, but it should be remembered that the strongest men (the most "fit") are the ones who die in battle, and that pestilences destroy the "fit" as well as the "unfit."

The great sterilizer of men and women, especially the latter, is gonorrhea; the great abortionist is syphilis. And again, these diseases are likely to be acquired by the "fit" among our men, and, unfortunately, often innocently acquired by the "fit" among our women. Therefore, war, pestilence, gonorrhea and syphilis entail an inferior progeny, and hence economically and socially are deplorable.

Most infectious diseases leave the individual less "fit," although after surviving an acute onslaught of some one or more of these diseases he may acquire an immunity to the germs and to infections in general, and he may even, as years go on, transmit more or less of such immunity to his offspring. Or, on the other hand, he may transmit a susceptibility to certain germs to his offspring. Most severe attacks, and even mild attacks, of infection leave permanent marks on the individual, even though he survive. Hence the great purposes of medical men, to-day, are: (1) to prevent disease; (2) to produce antivaccines that will protect or cause immunity to a disease without so disturbing the organism as to cause permanent lesions or damage to tissues; (3) if an antivaccine cannot be produced, to discover an antitoxin that will rapidly inhibit the infection when it occurs; (4) to advance physiology and chemistry so that the needs of a defective organ may be supplied by the organic extract or chemical stimulant that it needs; (5) to disseminate the knowledge now acquired as to proper hygiene, proper diet and food values, and the methods of acquiring not only infectious diseases but also chronic organic diseases and thus to stave off preventable diseases and postpone diseases due to age.

THE COLON BACILLUS

We harbor, more or less normally, some germs that may become pathogenic, notably the colon bacillus. The part this germ plays in causing acute inflammation or chronic disintegration of organs is variously stated, but it seems ever ready to attack us when our armies of protection are reduced in number or are otherwise engaged. It has been suggested that this germ or its toxins may be a cause of neurasthenia, arteriosclerosis and chronic nephritis, if not of liver disturbances and cerebral disturbances. It has been shown to cause appendicitis, cholecystitis, and perhaps pyelitis. It is thought by some to be a cause of the ever-frequent duodenal and gastric ulcers. It may play an important part in the pernicious anemias, which are now thought to be generally due to an infection. Not infrequently, in acute disease, complications occur which are attributable to the colon bacillus or its toxins. Often some chronic catarrh has been shown to be complicated, if not caused, by infection with the colon bacillus.

Whether there are other normal bacilli in the human body that under certain conditions may become pathogenic has not been discovered, but certain it is that in the prevention of disease we must take into consideration not only the infective but the putrefactive power of the colon bacillus. The prevention of putrefaction in the intestines will promote the immediate health of the individual and may prevent or postpone future organic disease.

Not to discuss the treatment of localized infection from colon bacilli, it may be stated that the treatment of intestinal putrefaction is, unfortunately, unsatisfactory. The prevention of constipation, withholding meat, including fish and poultry, from the diet, the administration of lactic acid bacilli as such or as soured milk, or the administration of yeast, and the cure of any gastro-intestinal inflammation that may be present by proper dietary, medicinal or surgical treatment, may prove very successful for some years in staying or preventing intestinal putrefaction. Although later to be discussed, it may be here urged that healthy teeth and gums are essential factors in the cure of intestinal fermentation.

SLEEP

This is a necessary and not sufficiently discussed part of our daily life. About one-third of each day of an adult's life should be spent in restful, natural sleep. Some individuals require more than others, but eight hours is the average requirement. Loss of consciousness, not syncope, not coma, not stupefaction by drugs, constitutes normal sleep. People who are not mentally alert, who are heavy and stupid or who are mentally insufficient sleep easily. This is true of cretins, of those of low mentality, of the absolutely illiterate (those who have little to think about), and of the very obese (in these cases drowsiness may be due to the amount of blood needed and circulated in the fat). Individuals who are anemic are likely to be sleepy and require more sleep. Children, young children especially, require much more sleep than adults, as their active brains become more readily fatigued.

The conditions favoring normal sleep are probably (1) fatigue products circulating in the brain or causing vasodilatation of the abdominal and peripheral circulation; (2) anemia of the brain more or less relative to that during consciousness, and (3) dimin-

ished cerebral reflex stimulation from external stimuli due to the dulling influence of fatigue products on reflex cerebral or spinal irritability, or it may be that such products circulating in the blood dull the senses and the peripheral sense nerves, or both.

During sleep the pulse is slowed and the brain contains less blood, while the other organs of the body contain more blood. The blood-pressure is lowered. The eliminative glands are more active, notably the sweat glands and the kidneys, but the secreting glands are diminished in activity. During sleep cellular repair takes place, final products of metabolism are formed and excretion is promoted.

Normal sleep cannot be produced by hypnotic drugs, although unconsciousness may be caused and the patient made to sleep. Under the action of hypnotics one or many organs do not functionate and cannot normally act, and the resultant sleep is inferior to natural sleep. Perhaps the most normal hypnotic is that which causes sleep by lowering the blood-pressure and causing anemia of the brain.

High blood-pressure, hysteria, etc., are causes of sleeplessness, and in these and many other conditions sleep must be brought about by physical methods, if possible; or it may be necessary to have recourse to drugs. Absolute insomnia is dangerous and must be stopped, but the continued use of hypnotic drugs invites only disaster, though the temporary use of such drugs may soon promote normal sleep and may actually save life. In fact, not enough thought is given by physicians to the amount of sleep that their patients obtain. Regulation of the sleep should be aimed at by every physician in every case requiring his care.

On the other hand, too much sleep is disastrous; the individual's brain becomes sluggish and incompetent, overpassive congestion of the abdominal organs takes place, sluggish metabolism occurs, constipation, kidney disturbances and a weakened circulation are the results. Patients who complain of being, or whom questioning shows to be, abnormally sleepy are pathologic and need medical advice. Overeating, alcohol, cerebral plethora, obesity, failing circulation and subthyroid secretion may all be causes of sleepiness. The cause being discovered, the treatment is self-evident.

Among the most frequent causes of insomnia are peripheral irritations, mental anxiety and hyperthyroid secretion.

WATER

The amount of water that should be taken is important, and quite generally is neglected by physicians in treating their patients. It is not a physiologic crime or a sign of a beginning pathologic condition to arise once at night to urinate (insurance examination blanks to the contrary notwithstanding), in cases in which the patient drinks a glass or two of water before retiring, which is not an infrequent habit. If the emunctories are to properly work during sleep, water is needed, and it should not be withheld. There is no intention in the above to minimize the importance of the symptom of arising several times at night to urinate as an indication of high blood-pressure and kidney, bladder or nervous irritability.

Water in plenty is an essential part of the diet at all times, and especially should goodly amounts of it be ordered in most conditions that require medical treatment. It is absurd to allow the "water cures" to do all of the ordering of this simple sanitary flushing commodity.

Before all operations, if there is time (that is, if it is not an emergency case), large amounts of water as well as plenty of starchy (carbohydrate) food should be given. After an operation the giving of a colon injection of from one pint to one quart of physiologic saline solution is good practice, and if the patient after operation receives such injection he will have less toxemia, less vomiting, better acting skin and kidneys, less headache and more sleep.

On the other hand, let us decry the thoughtless ordering of large amounts of water, or lithiated or other fool water, for patients who may be gouty and have defective kidneys, but who also have impaired circulation. An albuminuria from heart or kidney defect rarely calls for large amounts of water. Excessive amounts will weaken the circulation and cause congestion of the kidneys and dropsies.

The best time for taking extra water, that is, besides the normal goodly amount with meals, is three hours after eating. A considerable amount of water taken with a meal does not diminish or slow digestion; neither does a large amount of water taken between meals diminish the hydrochloric acid of the stomach. Hence water increases and does not inhibit gastric efficiency, and it promotes intestinal health. In cases of gastroptosis or gastric dilatation, large amounts of water may increase distress by overburdening the stomach, which does not readily empty itself.

(To be continued)

New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED BY THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION. THEIR ACCEPTANCE HAS BEEN BASED LARGELY ON EVIDENCE SUPPLIED BY THE MANUFACTURER OR HIS AGENT AND IN PART ON INVESTIGATION MADE BY OR UNDER THE DIRECTION OF THE COUNCIL. CRITICISMS AND CORRECTIONS ARE ASKED FOR TO AID IN THE REVISION OF THE MATTER BEFORE PUBLICATION IN THE BOOK "NEW AND NONOFFICIAL REMEDIES."

THE COUNCIL DESIRES PHYSICIANS TO UNDERSTAND THAT THE ACCEPTANCE OF AN ARTICLE DOES NOT NECESSARILY MEAN A RECOMMENDATION, BUT THAT, SO FAR AS KNOWN, IT COMPLIES WITH THE RULES ADOPTED BY THE COUNCIL.

W. A. PUCKNER, SECRETARY.

HEPCO FLOUR.—Hepco flour is a flour prepared from the Soya bean and has approximately the following composition: protein 42.9; carbohydrate 22.4, of which less than one-half readily yields sugar; fat 20.8; ash 5.1; fiber 4.2; water 4.6.

Actions and Uses.—It is claimed that clinical trials have shown that the carbohydrates in hepco flour are, in the main, not sugar producing and that therefore hepco flour is a suitable food material in cases in which carbohydrates are contra-indicated, as diabetes, amylaceous dyspepsia, etc. It has also been suggested for use in the diet in obesity. The nutritive value of 500 gm. of this flour corresponds to approximately 820 calories due to protein and 900 calories due to fat.

Manufactured by the Waukesha Health Products Company, Waukesha, Wis. No U. S. patent. U. S. trademark applied for.

Hepco Dodgers.—Hepco dodgers is a biscuit prepared from and having approximately the same composition as hepco flour.

Hepco Grits.—Hepco grits is a granulated "breakfast food" made from and having approximately the same composition as hepco flour.

To prepare hepco flour, Soya beans are cleaned and cooked with a little salt, then dried and ground. The flour is sifted and reground.

Hepco dodgers are made according to the following recipe: 1¼ pounds hepco flour; ½ teaspoonful of salt; mix well and add ¾ cupful of milk and 1 cupful of cold water; 2 eggs which have been thoroughly beaten; beat the whole mixture together into a cooky batter, roll out to ¼ inch thickness, cut with a cooky cutter and bake on well-buttered tins in hot oven. This recipe will make about three dozen dodgers. The dodgers are made up for shipping purposes by having a pure gelatine mixed in with the flour and then rolled out.

Hepco grits are made according to the recipe for hepco dodgers. The material is thoroughly dried out and put through a bread crumber.

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SATURDAY, SEPTEMBER 26, 1914

THE ETIOLOGY OF PELLAGRA

Recently[1] we discussed the theory put forward by Alessandrini and Scala that drinking-water, because of the presence of silica in colloidal solution, was of consequence in the causation of pellagra. This theory is a novel one in that the relation of silica to the disease had not previously been advanced.

Although pellagra has been known and studied for nearly two centuries, not only is its essential cause unknown, but the broad question whether it is to be classed as a dietary or a communicable (contagious or infectious) disease has never been definitely determined. The spoiled-maize theory has for many years been the favored theory abroad, but its correctness has, for various reasons, been questioned by many. In this country there has arisen, both in the lay and in the medical mind, the opinion that pellagra is to be classed among the infectious diseases. This view has received important support, first, from the Illinois Pellagra Commission[2] and, more recently, from the Thompson-McFadden Commission[3] (Siler, Garrison, and MacNeal).

In a recent issue of the United States *Public Health Reports*, Goldberger[4] gives a summary of certain work now being done by the United States Public Health Service on the study of pellagra, and advances some most suggestive facts which do not in any way support the infection theory, but strongly point to the belief that pellagra is a disease essentially of dietary origin; that it is brought about in some such way as, for example, by the absence from the diet of essential "vitamins," or possibly, as is suggested by the work of Myers and Voegtlin,[5] on the presence in vegetable foods of excessive amounts of a substance such as soluble aluminum salts. Goldberger states that a large series of monkey inoculations were begun a year ago by Lavinder, Francis and Lorenz at the Marine Hospital in Savannah and that, although over one hundred animals were inoculated in every conceivable way and with practically every tissue, secretion and excretion from patients in a number of grave and fatal cases, the results up to the present have been negative.

A study by Willets of the records of the Georgia State Sanitarium showed that of 996 patients admitted during 1910, excluding those who died, were discharged during their first year, or had pellagra on admission or within a year of admission, there remained at the institution after one year, 418. Of this number, 32 or 7.65 per cent. have developed pellagra since that time. Of the present employees at the asylum, 293 have been in more or less intimate association with pellagrins and have lived in substantially the same or in identical environment for at least one year. Had pellagra developed among these employees at the same rate as it did among the inmates, 22 of them should have developed the disease. As a matter of fact, not one has done so.

The studies at the orphanage at Jackson by Waring show that on July 1, 1914, of 211 inmates, 68 or 32 per cent. had pellagra. A study of the distribution of these cases with respect to age brought out the remarkable fact that practically all the cases were in children between the ages of 6 and 12 years, of whom over 52 per cent. were affected. In the group of 25 children under 6 years of age there were 2 cases and in the group of 66 children over 12 years old there was but one case. The author states that inasmuch as all the children live under identical conditions as to environment, the remarkable exemption of the group of children under 6 and over 12 years of age is no more understandable on the basis of an infection than is the absolute immunity of the employees at the Georgia State Sanitarium.

A searching inquiry was made at both institutions covering all conceivable factors that might possibly explain the striking exemption of the groups referred to and the only constant difference discovered related exclusively to diet. It was found that at both institutions those of the exempt groups were found to subsist on a better diet than those of the affected groups. In the diet of those developing pellagra there was noted a disproportionately small amount of meat or other animal protein food; and the vegetable component, in which corn and syrup were prominent and the legumes relatively inconspicuous elements, formed a disproportionately large part of the ration. Other than this gross defect, no fault in the diet was appreciable and the author believes that the evidence clearly points to it as the cause of the pellagra at the two institutions.

In this connection it is of interest to note that the Illinois Pellagra Commission[2] in their report state that the total population of the Peoria State Hospital dur-

1. Pellagra and Potable Waters, editorial, The Journal A. M. A., Sept. 5, 1914, p. 868.
2. Pellagra in Illinois, Condensed Report of the Illinois Pellagra Commission, Arch. Int. Med., August, 1912, p. 123, and September, 1912, p. 219.
3. Siler, J. F.; Garrison, P. E., and MacNeal, W. J.: Pellagra. A Summary of the First Progress Report of the Thompson-McFadden Pellagra Commission, The Journal A. M. A., Jan. 3, 1914, p. 8.
4. Goldberger: United States Pub. Health Rep., Sept. 12, 1914.
5. Myers, C. N., and Voegtlin, Carl: Soluble Aluminum Compounds. Their Occurrence in Certain Vegetable Products, Pub. Health Rep., June 19, 1914, p. 1625.

ing the epidemic of 1909 was about 2,100 and of these there were at least 8.4 per cent. with pellagra. Yet during that period none of the employees suffered from the disease, in spite of the fact that they were exposed fully as much to the bites of insects and drew their food and water-supplies from exactly the same sources as the patients. "This freedom from pellagra on the part of the physicians, nurses, attendants and other employees has been absolute in all of the institutions." That Commission found that most of the patients with pellagra belonged to the chronic insane composed of "the defectives, senile dements, epileptics and the terminal stages of dementia praecox."

Goldberger believes that the deteriorated mental condition, causing apathy and indifference, results in an eccentricity in the diet and that this, in conjunction with a diet admittedly low in animal protein components, explains the excessive prevalence of the disease at the Peoria institution, a hospital almost all of whose inmates in 1909 were of the hopeless, incurable class drawn from the other Illinois institutions.

THE DISTRIBUTION OF UREA IN THE BODY

It requires no argument to establish the importance which urea has in the chemistry of the living body. Any substance which is formed in the organism to the extent of 30 gm. or more a day, and which is ordinarily excreted with extreme promptness, deserves consideration as a product which needs to be handled appropriately by the normally functioning individual and as a possible factor of danger in disease. Despite the abundance of information regarding the occurrence of urea and its antecedents in the body, it is surprising that so little quantitative information has been available with respect to its distribution in the blood and tissues. The explanation for the paucity of data of this sort is doubtless to be found in the lack of easily applied methods of analytic study applicable to this nitrogenous excretory product. The introduction of the urease method[1] of measuring the content of urea has furnished a peculiarly suitable procedure for ascertaining something further about the distribution of urea under various conditions of health and disease. By the use of this method in the laboratories of the Johns Hopkins Medical School Drs. Marshall and Davis[2] have secured valuable statistics in this field.

Hitherto there has been a widespread belief that the genesis of urea is restricted to special organs, among which the liver has been assumed to exercise a dominant rôle. That other parts of the body are not without significance in urea formation could no longer be denied when it was found that this substance continued to be excreted in not inconsiderable quantities after more or less complete exclusion of the liver in experimental animals. In such cases the muscles have been assumed to play a dominating part. The newest investigations, on the other hand, have proved more conclusively than ever that urea occurs in all of the organs and tissues of the body. More significant than this wide-spread distribution, however, is the fact that it occurs throughout the body in approximately uniform concentration. This is true both in normal conditions and in cases in which, owing to such interference with excretion, an abnormally large amount of urea is present. An exception to the rule is found in the case of fat. This fact, however, is not surprising in view of the well-known slight solubility of urea in fats and the added fact that only relatively small amounts of water are present in adipose tissue. The somewhat higher content of urea found in the kidneys and other parts of the urinary tract is readily understood as the result of the unavoidable contamination of these organs with urine.

The approximately uniform distribution of urea throughout the body is also found when the urea content has been increased either by injections of urea or by interference with excretion by the kidneys, or by both means. The body cells appear to be able to take up surprisingly large quantities of the substance. The diffusion of urea to all parts of the body is accomplished very quickly. For example, no matter how soon blood is withdrawn after the end of an injection of urea a large part of this nitrogenous material has already gone out of the circulation. In view of this fact it is not difficult to understand why the concentration in the blood is never essentially higher or lower than that in the tissues themselves. Furthermore, urea is eliminated with extreme rapidity by the kidneys. The rate of excretion in normal animals is directly proportional to the concentration of urea in the blood. It may be retarded, however, after a certain amount of dehydration has occurred, that is, when elimination cannot be accomplished owing to lack of water for the kidneys to secrete. If water is then given, urea is again thrown out at an increased rate. There are doubtless few, if any, substances with which the body cells come in contact that permeate all kinds of cells so readily and that are eliminated so easily as is urea. As Marshall and Davis have pointed out, it is clearly the most desirable form into which nitrogen could be put for elimination from the body.

When the excretion of urea is prevented, either experimentally or by disease in the case of nephritics, the entire amount formed is stored in the body with the exception of small amounts secreted in the bile, sweat, etc. Here, again, its distribution is very general and uniform. No evidence whatever has been obtained of the possible transformation of urea into other substances in the body. This fact, taken in connection with the ease with which urea is distributed, excreted, or stored up as the case may be, is not without signifi-

1. Marshall, Jr., E. K.: A Rapid Clinical Method for the Estimation of Urea in Urine, Jour. Biol. Chem., 1913, xiv, 283; A New Method for the Determination of Urea in Blood, ibid., xv, 487.

2. Marshall, Jr., E. K., and Davis, D. M.: Urea: Its Distribution in and Elimination from the Body, Jour. Biol. Chem., 1914, xviii, 53.

cance in relation to the symptoms observed in uremia. The chemical and physiologic properties of urea are such that it ought to be a non-toxic substance and the newer experiments show it to be non-toxic in any moderate or fairly large amounts. Only when introduced in enormous doses so that it approaches a concentration of 1 per cent. of the tissues in general does it produce a fatal effect. For this reason the Baltimore investigators conclude that it is improbable that urea is the only toxic agent in uremia, as has been supposed by some writers, although it may take some share in producing the symptoms of this condition.

The foregoing observations illustrate how greatly our knowledge of the chemistry of the organism is advanced when quantitative methods can be brought to bear on its problems. For additional illustrations one need only refer to the great advances which have been made in recent months in following the distribution of other so-called catabolites, such as creatin, creatinin, uric acid, and the amino-acids, in the blood and tissues. Indeed, blood and tissue analyses have emerged into new prominence in the laboratory. It is surprising to realize that until this period, the extent to which urea may be stored in the tissues has never been accurately determined. The newer researches have served to clear up many earlier conflicting and unsatisfactory data. They have demonstrated that retention of urea is a regular occurrence in certain cases of severe nephritis, and that the amount of urea in the blood does not account for the amount theoretically present in the organism. Finally, they have furnished evidence of an increase in the urea content of tissues in cases in which the blood urea is abnormally high. Contributions of this sort are certain to help clear up the pathology of conditions like uremia before long.

EARLY HUMAN REMAINS IN AMERICA

The determination of the age of the earliest human remains found on the American continent is of great interest. Until a few years ago North America was supposed to offer the most valuable evidence in this regard, though the Bureau of American Ethnology declared in 1907 that "no specimen had come to light in the northern continent which from the standpoint of physical anthropology represented other than relatively modern man." At that time some "apparently epoch-making discoveries" were reported from the Lagoa Santa Caves of Brazil, together with numerous finds of bones and cultural objects in Argentina. As a result the attention of the world was attracted to these places and there was a renewal of the story of Atlantis, the origin and descent of the human race being traced from very primitive anthropoid forms of South America. More recently interest has reverted to North America from the discovery of human remains in an asphalt deposit at Rancho La Brea in Southern California. A preliminary report on these was read before the Museum of History, Science and Art of Los Angeles, June 11, 1914, by John C. Merriam.[1]

The Bureau of American Ethnology was so much interested in the South American finds that two experts were sent to conduct an impartial investigation into the scientific significance of the discovered objects. Dr. Ales Hrdlicka went as the anthropologist and Mr. Bailey Willis of the United States Geological Survey as geologist. The material brought home from the various beds by the Hrdlicka-Willis expedition was submitted to the paleontologist of the United States Geological Survey and to the Geophysical Laboratory of the Carnegie Institution of Washington for an exhaustive investigation of their physical character and conditions of origin. Almost needless to say, the scientific criteria determined on were thorough and such as were calculated to the best possible degree to secure reliable results.

The conclusion was, "It seems quite evident that the human remains from the Lagoa Santa Caves cannot be accepted without further and more conclusive proofs as belonging to a race which lived contemporaneously with the extinct species of animals found in the same caves; and there is no reliable foundation for the remainder of the data relating to the specimens on which geologic antiquity can be based."

A similar unfavorable conclusion was reached regarding the antiquity of the skull taken from the harbor of Buenos Ayres. On this was based the theory of *Diprothomo platensis*, so called from the River Platte, in which the skull was found. The specimen had been taken from the oozy bed of the river when the workmen were excavating a rudder pit for the dry dock at Buenos Ayres. In geologic age, according to Professor Ameghino who wrote about it, it was a remnant from the Lower Pliocene and had originally belonged to a second or premediate precursor of man as part of his brainpan. He asserted that as to conformation it was older and less developed than the famous Neanderthal skull. Careful examination, however, showed that the facial angle is practically the same as in the average Indian. Dr. Hrdlicka says, "The Buenos Ayres skull fragment fails utterly to reveal any evidence which would justify its classification as a representative of a species of ancient primates, premediate forerunners of the human being, the *Diprothomo*. Every feature shows it to be a portion of the skull of man himself; it bears no evidence even of having belonged to an early or physically primitive man, but to a well-developed and physically modern-like individual."

Mr. Bailey Willis, the geologist of the North American expedition, after a careful investigation of the circumstances of the find and an examination of the character of the river bank, finds that he can give no

1. Merriam, John C.: Science, Aug. 7, 1914.

weight to the theory that "the unknown workman who found the skull and gave it to the foreman really dug it out of undisturbed ancient pampean." The question of provenience is the crux of the whole matter of determining the age. It is this question also that has arisen with regard to the Rancho La Brea discoveries, that is, whether the materials existed originally in the associations in which they were subsequently found. In asphalt chimneys or tar pits such as are now being excavated at Rancho La Brea, materials may and indeed almost necessarily do move in the course of time, and their present associations do not necessarily determine their age. Objects of very different ages may have drifted together by gravity in the viscous material in which they lie buried.

The conclusion of the preliminary report, then, is that, while it is not possible to give a definite estimate of the age of the skeleton found, it belongs to a distinctly modern stage of evolution. It does not necessarily belong to the present historical period, but cannot be considered as having antedated it by many thousands of years. Merriam considers it well worth exhaustive scientific investigation, and the last word on the subject cannot be written until a great deal more study has been given the objects found. The associations are with specimens distinctly later in age than the typical Rancho La Brea fauna, which come from a very old geologic period. According to Dr. A. L. Kroeger, the racial characteristics do not differ decidedly from those of persons whose remains have been excavated in mounds on Santa Rosa Island off the coast of Southern California. While the question of antiquity is undecided, every evidence which we have would seem to point in North as well as South America to the comparatively recent origin or occurrence, geologically speaking, of man on our continent.

RESUSCITATION FROM MINE GASES

The Report of the Committee on Resuscitation from Mine Gases, appointed by the Council on Health and Public Instruction of the American Medical Association at the request of the Bureau of Mines of the Department of the Interior, has just been published by the Bureau.[1] This commission, which grew out of the work of the Joint Committee on Resuscitation from Electrical Shock, appointed by the Council from the Fellows of the American Medical Association, the National Electric Light Association and the American Institute of Electrical Engineers, consists of Dr. Walter B. Cannon, Chairman, Professor of Physiology, Harvard University; Dr. George W. Crile, Cleveland; Dr. Joseph Erlanger, Professor of Physiology, Washington University, St. Louis; Dr. Yandell Henderson, Professor of Physiology, Yale University, and Dr. S. J. Meltzer of the Rockefeller Institute for Medical Research. This committee was requested by the director of the Bureau of Mines to carry on investigations for the development of an efficient method of resuscitation which may be administered by miners and other persons who have not had medical training, but who frequently have the opportunity to treat fellow workmen overcome by mine gases in places, generally in mines, that a physician or surgeon cannot reach in time to save life.

The committee reports that it has visited mines in the bituminous and anthracite coal regions of Pennsylvania, has met and talked with men of wide practical experience, witnessed demonstrations of artificial respiration by different methods and examined them critically, studied all the available mechanical devices for maintaining breathing and carried on a considerable amount of experimental investigation into the best methods of resuscitation following the inspiration of mine gases.

The report reviews the physiology and pathology of carbon monoxid poisoning, discusses the Sylvester and Schäfer methods of artificial respiration and, following the course laid out in the previous report on resuscitation from electrical shock, strongly recommends the Schäfer method on account of greater simplicity and ease of performance, absence of trouble from the tongue blocking the air passage, lessened danger of injuring the liver or breaking the ribs and larger ventilation of the lungs. The first three of these advantages were apparent. On the fourth point, larger ventilation, the commission instituted a series of experiments both on men and animals which convinced the committee that the prone pressure method of Schäfer is the most effective means of artificial respiration. Regarding the mechanical devices, four machines are now on the market, the Draeger pulmotor, the Dr. Brat apparatus, the lung motor and the Salvator. The pulmotor and the Dr. Brat apparatus were investigated and tested by the committee and were disapproved. It was found that "repeated suction of air from the lungs is not physiologic and if continued, is apt to result in injury to the lungs and inadequate inflation." In connection with the experiments of the commission on mechanical appliances, Dr. Meltzer has devised an apparatus which is easily and quickly applied and which the committee recommends on account of its certain action, the freedom from suction in expiration, and its lightness, cheapness and simplicity. A description of the apparatus and directions for its construction are contained in the pamphlet. This apparatus has already been described by Dr. Meltzer in THE JOURNAL.[2]

Summing up its experience and findings, the committee recommends artificial respiration in all cases of

1. The report is designated Technical Paper No. 77, and can be obtained by sending 5 cents to the Superintendent of Documents, Government Printing Office, Washington, D. C. It should be obtained by all interested in this subject.

2. Meltzer, S. J.: Simple Devices for Effective Artificial Respiration in Emergencies, THE JOURNAL A. M. A., May 10, 1913, p. 1407.

gas poisoning and, as mechanical devices are seldom at hand, manual methods are recommended for first aid. Of these the prone pressure method is recommended unless the patient is suffering from some local wound which makes this impossible, in which case the Sylvester method may be substituted. In all cases of carbon monoxid poisoning, oxygen should be given instead of air. If the victim is still breathing spontaneously, oxygen may be given by fastening to the face a mask provided with outlet valve and an inlet valve, connected with a bag provided with oxygen from a cylinder. The Meltzer apparatus is recommended as the best of the mechanical devices available.

This report together with the report on resuscitation from electrical shock are notable and valuable contributions to our practical and scientific knowledge of the causes, conditions and treatment of these industrial accidents. The *Electrical World* at the time the report of the Committee on Resuscitation from Electrical Shock was published, reprinted this report in large quantities and distributed them with the accompanying chart, to electrical plants, powerhouses and stations all over the country. They have been translated into a number of foreign languages and are recognized as standard and authoritative monographs on this subject. The report of the Committee on Resuscitation from Mine Gases is equally valuable and worthy of a similar wide-spread distribution. The work done by the members of these two commissions is a credit to the medical profession and the Association which they represent.

WORK FOR THE SAKE OF HEALTH

Extensive alterations in the social and industrial conditions of large groups of individuals almost always incidentally bring about changes in their hygienic situation. As a general rule, when the changes are in the direction of what we regard as social betterment the conditions of living are improved, sanitation is cultivated in greater measure, and the promotion and preservation of health follows as a natural consequence. A study of such movements reveals the advantages, from the point of view of both public and personal hygiene, that have followed the pure food crusades, the campaign against alcoholism, child-welfare innovations, investigations of institutional management, regulation of industrial conditions in respect to hours of work, factory inspection, etc.

There are, strange as it may seem at first thought, certain modern industrial changes which carry with them detrimental features that are not apparent on the surface. A growing group among whom the amount of muscular work done is small in comparison with the daily activities of their ancestors is coming into existence. We are not referring here to the fact that shorter hours of work have everywhere become the custom—that the blacksmith who formerly toiled twelve hours now completes his working day in eight hours. The changes which we have in mind here are a consequence of altered methods of conducting business with the modern extension of commerce. Machinery has replaced muscle. The development of the industries by machinery has called for a different type of human working-power in which skill rather than strength is required. As a modern writer[1] has expressed it, the bodily qualities of the worker have been forced by the employer more and more into the background of valuation. Industrial factory work requires not so much strong men as persons who can perform with skill the many small tasks which the machines have so far not been able to perform. Hence the tendency to employ children, half-grown persons and women.

More significant than this is the fact that the number of those who do little manual labor has increased greatly. This is an era of office workers, of business and governmental officials whose implements are the desk chair, pen and pencil, rather than the hammer and the hoe. Even in agriculture machinery has eliminated some of the hardest types of manual labor. Muscular exercise, however, is a benefit rather than a detriment to the human economy. It improves the function of the essential organs of the body. Hence there has arisen an unexpected consequence, namely, the habit of trying to avert the possible harmfulness of some of these changed conditions by "balancing the lack of paid muscle work by work for hygienic reasons, by play and sport." The creation of work for the sake of health sounds almost paradoxical.

Current Comment

"LARGE" AND "SMALL" MEDICAL COLLEGES

The application to medical colleges of the terms "large" and "small" should and usually does depend on the size of the classes enrolled. With this understanding it can be stated that there are some small medical colleges which are admirably equipped and which are undoubtedly furnishing their students with an excellent scientific and practical medical training. In proportion to the numbers of students enrolled, some of these small colleges are among the best equipped institutions in the country, and some of them have been rated in Classes A+ and A by the Council on Medical Education. No one of these satisfactory small colleges, however, is "notoriously lacking in equipment" as implied in an editorial comment in one of our monthly exchanges. There are, indeed, several small medical colleges which are "notoriously lacking in equipment," but in no instance does such a

1. Rubner, M.: Address on the Nutrition of the People, delivered before the Fifteenth International Congress on Hygiene and Demography, at Washington, Sept. 24, 1912, and published in the Transactions.

school furnish a satisfactory training in medicine. At the other extreme, there are some medical colleges which have large enrolments of students, out of all proportion to the limited supply of expert teachers, laboratory equipment and clinical facilities. Because of these deficiencies or because of a too liberal administration of entrance standards, such schools do not and cannot furnish a satisfactory training. Some of these medical schools with large enrolments, for good reasons, are rated in Classes B and C by the Council on Medical Education. A reference to state board statistics, furthermore, shows that the graduates of some of these "large" medical schools do make poor records in the licensing examinations. It should not be said, however, that "as a rule the larger the college the higher is the percentage of its graduates who fail before the state examining boards" as stated in the editorial referred to. No such statement, meanwhile, is made in the State Board Number of THE JOURNAL,[1] to which the editorial refers, nor does any statement appear which would give such an impression. In the State Board Number it is stated that "the mere fact that a college has large classes is no indication that it furnishes a better medical training."[2] It is also true that "the larger the college . . . the more serious is inferior teaching."[3] But these statements do not imply, nor should they be interpreted to mean, that in *all* colleges having large classes the teaching is inferior, or that all of them have large percentages of their graduates fail before state licensing boards. On the contrary, there are several colleges having large enrolments which at the same time have excellent supervision and, in proportion to their students, have an ample supply of expert teachers and an abundance of laboratory equipment and clinical facilities. Some of these large colleges, in fact, furnish an excellent medical training and their graduates make excellent records before state licensing boards. We would emphasize that a medical college should not be judged by the number of students enrolled but by the qualifications of its teachers; the possession of suitable and well-equipped laboratories; the abundance of clinical facilities available; the supervision exercised over the work and welfare of its students and—last but not least—the evidences of the skill and training of its graduates.

1. THE JOURNAL A. M. A., May 23, 1914, p. 1639.
2. Ibid., p. 1660.
3. Ibid., p. 1655.

THE SIGNIFICANCE OF THE WORD LUTEIN

The word "lutein" has long been applied in physiologic chemistry to designate a group of fat-coloring matters which occur in nature and which have more recently often received the general designation of lipochromes. These yellow pigments are found in the adipose tissue, in the serum of the blood, in serous fluids, in fatty structures of the retina, in the egg-yolk, and in the corpora lutea. The use of the term "lutein" has been restricted as a rule to the yellow coloring-matter which develops in these ovarian structures, although one can find the word applied to derivatives of other physiologic tissues as synonymous with lipochrome.[1] Thus in a recent discussion respecting the appearane of a yellow pigment in cerebrospinal fluid in cases of tumor of the spinal cord the word "lutein" is employed to designate the color.[2] Hitherto the chemistry of this group of compounds has been very indefinite and they have been classified and identified by their solubilities and other physical properties. Now that the subject is receiving more serious study, however, and the precise nature and relationships of the lipochromes or luteins is being cleared up,[3] it may soon be possible to speak accurately of carotin or xanthophyll or some other specific substance instead of applying the more indefinite group expressions referred to above. It therefore seems particularly unfortunate at this time to find the word "lutein" entering anew into the nomenclature of medicine in an entirely different sense. Lately various preparations of desiccated corpora lutea from animals are being sold under the designation of lutein.[4] This new therapeutic product obviously represents something more than merely the yellow pigment of a part of the ovarian structure, for there is no evidence that the lipochrome itself is responsible for any physiologic effects. Evidently the word "lutein" has commended itself, without consideration of the historical import of the word, as a euphonious designation which would at once suggest the natural origin of the product. This is not an isolated instance of confusion of terms. The word "bromalin" has been devised by manufacturers for a synthetic bromin derivative despite the existence of the word "bromelin," the name of the proteolytic enzyme of the pineapple. Other instances might be cited. We trust that a reference to the matter here may help to avert further undesirable unnecessary complication of this sort on the part of those who are devising names for new products.

1. See, for example, Hammarsten-Mandel: Text-Book of Physiological Chemistry, 1911, p. 260.
2. Clarke and Lansdown: Brit. Med. Jour., May 9, 1914. Boyd: ibid., May 23, p. 1158.
3. The Natural Yellow Pigments Occurring in the Body, editorial, THE JOURNAL A. M. A., Sept. 12, 1914, p. 948.
4. See New and Nonofficial Remedies, 1914, p. 183.

PUBLIC HEALTH IN INDIANA

Health administration in Indiana has for a long time past been vigorous and energetic, as it is in many of our other states. It has also been unique, peculiarly up-to-date and popular in its methods of attracting attention and affording instruction. The latest activity of the health forces of the state is thoroughly characteristic. Governor Ralston has issued a proclamation designating Friday, Oct. 2, 1914, as Disease Prevention Day. He urges the cities and towns throughout the state to make special arrangements for appropriate exercises, emphasizing the importance of public health, and the joint responsibility of all citizens therefor in order to inspire in them a desire to cooperate in all sane efforts for the prevention of physical diseases. The state board of health has prepared a special bulletin containing a copy of the governor's proclamation and suggestions for the celebration of Disease Prevention Day in the towns of Indi-

ana. Some of these suggestions are terse and apt and deserve to be circulated.

"Get up a public-health procession. In cities the mayor should head the procession; in towns the town board of trustees, the town board of health under the law, should lead. There should be a brass band; drums and trumpets should be used; music is necessary for a procession; school girls dressed in white bearing banners with health mottoes, boys in white or otherwise neatly dressed carrying banners with health mottoes. Where there are high schools, the pupils should try to present some original idea representing the importance of disease prevention."

The advice to business men is equally emphatic.

"Business men should be represented in the procession. The most important business before the business man to-day is the business of public health. Retail stores should dress their windows in articles that deal in, belong to or hint at cleanliness and health. Hardware stores can show garbage cans, garden hose, fly traps, and rat traps. Dry goods merchants can show a pile of towels and soap arranged around a bathtub. Grocers can make pure food displays and so can restaurants."

The advice to individual citizens is equally direct, so that no one can feel that he is being omitted or has no part in the celebration.

"Let every home, each front yard and back yard, the rears of stores and all streets and alleys be made specially clean for Disease Prevention Day. Let each person wear clean clothes on that day, take a bath, put on a clean shirt, clean socks and clean collar and get his shoes shined. Get a hair cut and a shave, wash your hands and face, clean your finger nails and don't spit on the side walks. Let everybody be clean and talk cleanliness and health."

Suggested mottoes for Disease Prevention Day are also contained in the bulletin. Some of these are:

"The only good fly is the dead fly;"
"Well-kept alleys pay better dividends than well-kept cemeteries;"
"Public health is public wealth;"
"Bat the rat and swat the fly;"
"Don't take patent medicines;"
"All the time is clean-up time;"
"Dust, dirt, dampness, darkness, drink, will always kill."

That the state board of health does not hesitate to follow its own suggestions is shown by the public-health side-show recently given at the Indiana State Fair. A large circus tent was installed on the fair grounds with banners depicting health topics displayed in front after the manner of the time-honored side-show. The secretary of the State Association for the Study and Prevention of Tuberculosis acted as barker for the show and, through a megaphone, announced to the gathered crowds the attractions to be found within the tent. The Indianapolis newsboys' band gave serenades at intervals in front to attract the people. Inside the tent, lectures illustrated with lantern-slides and moving pictures, exhibits, charts and demonstrations on various health topics all served to emphasize the importance and value of health. It is estimated that over twenty thousand people passed through the tent during the State Fair. This sort of a campaign will certainly have a marked result on public sentiment and eventually on permanent health conditions in the state. The people of Indiana are to be congratulated on having a state board of health that is active and progressive and especially on having a broad-minded, intelligent and public-spirited governor who is sufficiently interested in the welfare of his people to place himself at the head of the public-health movement in the state.

GIVING A DOG A BAD NAME

In a recent issue of THE JOURNAL attention was called to the enlightened action on the part of an advertising manager for a cement company in demanding that advertisements for his product should not be lined up with advertisements of fraudulent wares. He holds, in common with most up-to-date advertising men, that every dishonest advertisement tends to undermine the confidence of the public and thus hurt every decent advertiser. A good illustration of the principle involved in this action appeared in a recent issue of a Chicago afternoon paper. On one page of this paper there was a fairly large advertisement of Marshall Field & Company. The advertising copy was in good taste; the wording was conservative, and the general effect of the advertisement was convincing. The products advertised were women's garments. On the same page of the paper, and in close proximity to the department store's "copy," was an advertisement of Lydia Pinkham's fraudulent nostrum (alcohol, 18 per cent.) urging women who have "that weak, languid, always tired feeling," to purchase this "great blessing." On the other side of the store's advertisement "Beecham's Pills" blared forth in heavy black-faced type their lying message to the world. Just below was a paragraph entitled "Valuable Discovery in Complexion Beautifier." This was in news style and had nothing to indicate that it was an advertisement. It told women of the alleged virtues for the complexion of "mercolized wax," a particularly vicious caustic poison. It is interesting to speculate on the damage, from an advertiser's point of view, done to the Marshall Field & Company advertisement by lining it up in close proximity to three evident frauds. It is still more interesting to think what would happen if the decent advertisers in the newspaper referred to were to send to their advertising agencies the same message that was sent by the cement company's advertising manager:

"Will you please say to all newspapers desiring to carry our advertising that we decidedly object to being placed in close company with noisome patent-medicine ads. and other fakes or near-fakes. . . .?"

Interference with Pathologic Phenomena Not Always Justified.—We have in the past too readily taken for granted that every unusual phenomenon observed in a sick person was, in itself, harmful; thus we have interfered with inflammatory processes, with pyrexia, and heightened blood-pressure, without realizing that these were, in a majority of cases, compensatory phenomena, implying active and probably quite efficient self-defense on the part of the organism. "Think for a moment, any of you," says Sir James Goodhart, "your finger is on the pulse of excessive hardness; you want to make it permanently soft. Have you ever accomplished your purpose to your satisfaction? and if you answer 'No,' as I think you must, you may cancel your disappointment by asking yourself another question: 'If I had, where would the patient have been?'"—Arthur J. Brock, *Edinburgh Med. Jour.*

Medical News

DISTRICT OF COLUMBIA

Pellagra and Typhoid.—Five cases of pellagra are reported from private practice. An epidemic of seventy-five cases of typhoid fever exists. No typhoid bacilli have been found in the water-supply.

Personal.—Dr. Benjamin Meade Bolton, Washington, sailed from New York for Cuba, August 29, to conduct a campaign for the Department of Agriculture of Cuba against hog cholera.——Dr. Edward Fraser has succeeded Dr. Clarence H. Gregory as officer in charge of the George Washington University Hospital.

ILLINOIS

Personal.—Dr. Charles E. Parker has succeeded Dr. Jane R. Keefer, resigned, as superintendent of the nurses' department of the Sterling Public Hospital.——Dr. Albert J. Roberts, Ottawa, has been reelected physician of La Salle County.——Dr. and Mrs. Joseph F. Duane, Peoria, have returned from Europe.

Protection against Bubonic Plague.—The secretary of the State Board of Health, Dr. C. St. Clair Drake, is insisting that rat extermination and clean-up campaigns shall continue to be actively carried on at all Illinois ports of entry for passengers and merchandise from New Orleans and other territory and on all boat and rail transportation companies entering Illinois from the South.

Conference of Charities and Corrections.—The nineteenth annual conference of Charities and Corrections will be held October 24 to 27, at La Salle, Peru and Oglesby. At the same time and place, the Illinois Anti-Tuberculosis Association, the State Probation Officers' Association and the State Association of Superintendents of County Homes will hold their annual meetings. Dr. Emil G. Hirsch, Chicago, is president of the conference.

Chicago

Loan on Hospital.—The Catholic bishop of Chicago has obtained a loan of $285,000 for ten years at 5 per cent. interest, secured by a trust deed on the property of St. Mary's Hospital, occupying the block included by Hadden and Oakley avenues and Leavitt and Thomas streets.

Personal.—Dr. William E. Buehler has been elected president of the Public Safety Commission.——Dr. Albert J. Ochsner was the guest of honor at the monthly meeting of physicians held at Maimonides Hospital, September 18. The subject of his address was "New Phases in Hernia."——Dr. and Mrs. Joseph L. Hancock and daughter have returned after an extensive trip through the West, including California.

European Travelers.—Dr. and Mrs. Walter H. Allport and family have sailed for home.——Drs. Sara C. Buckley and Benjamin Barker Beeson have returned from abroad.——Dr. and Mrs. Zenos H. Going are in London.——Dr. and Mrs. Harry B. Bailey report that they are safe in Switzerland.——Dr. Winfield Scott Hall and family are reported to be in Zurich, Switzerland, awaiting transportation to this country.

INDIANA

Epidemic of Infantile Paralysis.—The first stage of an epidemic of infantile paralysis is reported from South Bend. Three deaths are said to have occurred during August.

Disease Prevention Day.—Through the representatives of more than a dozen civic and commercial organizations, Indianapolis has prepared an elaborate program for the observance of Disease Prevention Day which is set for Friday, October 2.

Tuberculosis Sanatorium for Indianapolis.—The first tangible step toward the establishment of a tuberculosis sanatorium for Marion County and Indianapolis, was taken by the Marion County Council, September 9. The council agreed to make a tax levy of 1 cent on $100, the funds thus derived to be placed in the sinking fund for the construction of a hospital for tuberculosis patients. This levy, it is estimated, will amount to about $27,000 a year and the building required will cost about $65,000 and will accommodate 134 patients.

IOWA

Personal.—Dr. Mary K. Heard, Iowa City, has returned from abroad.——Dr. Charles E. Glynn has been elected president, and Dr. Jacob S. Weber, secretary and treasurer of the Davenport Hospital.

Medical Inspection Inaugurated.—The medical inspection of the Council Bluffs city schools began September 14, when the newly appointed nurse, Miss Irene Jones, who is cooperating with Dr. Vernon L. Treynor, medical inspector, started on her rounds of inspection.

Hospital News.—Dr. Gerritt E. Ver Meer, Rock Valley, and Dr. Frank P. Winkler, Sibley, have purchased the Methodist parsonage, and after remodeling it, will open the building as a hospital.——Dr. and Mrs. Waggoner, De Witt, have donated to the Mercy Hospital, Clinton, the furnishings for one room in the hospital.——Physicians at Fort Dodge have established at Fort Dodge clinical and Roentgen-ray laboratories under the care of Dr. F. H. Glenn, formerly of Chicago.

LOUISIANA

Health Train Starts on Tour.—The health train of the State Board of Health left New Orleans, September 13, on a fourteen-day educational tour of the state. In addition to Dr. Oscar Dowling, Shreveport, and the regular force of the train, Drs. Charles C. Bass and A. J. Terhune were members of the party. It is purposed to establish a temporary laboratory at each stopping place where such tests will be made as are desired. A supply of antityphoid serum was also taken on the train. This trip is merely educational and will include lectures illustrated by moving pictures.

Tropical Medicine Faculty Appointment.—Dr. William H. Seemann has been elected dean of the faculty of Tulane University School of Hygiene and Tropical Medicine, and the following appointments to the faculty have been made: Dr. Abraham L. Metz, professor of chemistry; Dr. Andrew G. Friedrichs, professor of oral hygiene; Dr. Isadore Dyer, professor of skin diseases; Dr. Edouard M. Dupaquier, professor of tropical medicine and acute infectious diseases; Dr. Charles C. Bass, professor of experimental medicine and director of the laboratories of clinical medicine, and Dr. Joseph D. Weis, professor of tropical medicine.

MARYLAND

Hospital Offers Bonds.—The new South Baltimore Eye, Ear, Nose and Throat Charity Hospital has begun a campaign to dispose of $50,000 worth of bonds, authorized to make possible the erection and equipment of the new hospital building which is nearly completed.

Twenty-Fifth Anniversary of Johns Hopkins.—The twenty-fifth anniversary of the opening of the Johns Hopkins Hospital, the twenty-first anniversary of the opening of the medical school, the second reunion of the alumni of the medical school and the first general reunion of the alumni of the training school for nurses, will be made the occasion of an elaborate celebration at the hospital, which will open October 5 and continue throughout the week. In connection with the celebration the annual Herter lectures will be given by Dr. Thomas Lewis of University College, London. Scientific demonstrations and lectures and varied social entertainments have been arranged to fill in the entire time.

Baltimore

Colorad Insane Transferred.—All the colored insane at the Cecil County Insane Hospital have been removed to the State Hospital at Crownsville.

Medical Aid at Flag Centennial.—In a report to the managing directors of the Star Spangled Banner Centennial, Dr. George L. Wilkins, chairman of the medical relief committee, stated that 280 cases were treated at the various emergency hospitals established along the routes of the parades. One hundred and twenty-eight physicians and seventy-five nurses gave their services free during the week.

Personal.—Drs. James J. Carroll and Gilbert T. Smith have returned from Europe.——Dr. Hiram Fried has returned from abroad.——Dr. William Osler, former head of the medical department of the Johns Hopkins Hospital and now regius professor of medicine at Oxford, England, has been made an honorary colonel in the British army.——Dr. Benjamin O. McCleary has been appointed health warden for the Twentieth Ward, succeeding Dr. William A. Knell, resigned.

MINNESOTA

Personal.—Dr. and Mrs. O. A. Oredson, Duluth, are in Berlin where Dr. Oredson is caring for the wounded in a military hospital.——Dr. Richard R. Cranmer, Minneapolis, has returned from abroad.

State Society to Meet.—The Minnesota State Medical Association will hold its annual meeting at the St. Paul Hotel, St. Paul, October 1 and 2, under the presidency of Dr. Alfred E. Spaulding, Luverne.

Urges County Health Organization.—Dr. H. W. Hill, executive secretary of the Minnesota Public Health Association, proposes the organization of a health association in each county of the state.——County health organizations have already been formed in Wilmar and Marshall counties.

Advance in Work against Tuberculosis.—The first annual report made by Dr. Robinson Bosworth, executive secretary of the advisory commission of Minnesota State Sanatorium, gives an interesting summary of the progress of the work of establishing county tuberculosis sanatoriums. Nopeming Sanatorium, St. Louis County, 14 miles from Duluth, is under operation with sixty patients; Ottertail County Sanatorium at Battle Lake, with sixty-five patients; Nopeming County Sanatorium has been enlarged by the addition of an infirmary of thirty-five beds, a heating plant and laundry, at an expense of $75,000; Ramsey County Tuberculosis Pavilion is open this month with a capacity of 110 patients; Hennepin County is constructing a seventy-five bed institution at Glen Lake near Hopkins, which will be completed within a year at a cost of about $100,000; Lincoln, Lyon, Pipestone, Murray, Cottonwood, Rock, Nobles and Jackson counties have organized a sanatorium district and are seeking a suitable location for the joint sanatorium on which about $95,000 will be expended; Yellow Medicine, Chippeway and Renville counties have voted to build a joint sanatorium providing a fourth enters the group. Lac Qui Parle is the fourth county of this group; Wabasha County has requested the commission to choose its selected site; Douglas County has made a tax levy to build a sanatorium and is endeavoring to get Grant, Pope and Stevens counties to join with it; the county board of Blue Earth County is leaving the matter of a sanatorium to the wishes of the people at an election; Brown and Nicollet counties are ready to build a sanatorium, and Redwood and Watson counties wish to join this group; Goodhue County has accepted plans for a building to be erected on the Cannon Falls site; Pope and Norman counties have purchased a sanatorium site at Crookston; Clay and Becker counties have selected a location at Lake Park and have appointed an architect; Beltrami, Koochiching and Hubbard counties have voted their tax levies, appointed sanatorium commissions and will build at or near Bemidji; Marshall County, either alone or with Pennington County, will build a sanatorium; Wadena and Todd counties have made the necessary levy and are endeavoring to secure a third county for the group. The expenses of the advisory commission for the year were $9,456.93, leaving a balance in hand of $543.07.

MISSISSIPPI

Pellagra Not Admitted to Vicksburg.—The trustees of the Vicksburg Emergency Hospital have passed a resolution to accept no pellagra cases for treatment on the ground that the hospital has no facilities for the proper treatment of such cases. The railroads have been notified not to bring pellagra patients into Vicksburg, but protest that they have no means of diagnosing the disease.

Malaria in Washington County.—In response to the request made to the surgeon-general of the Public Health Service that antimalarial work be undertaken at Greenville and large plantations nearby, Surgeon Rudolph H. Von Ezdorf, Assistant Surgeon Robert C. Derivaux and Sanitary Engineer J. A. Lee Prince, U. S. P. H. S., have been detailed to make an investigation of the conditions contributing to the spread of malaria in that region.

New Society Organized.—The Homochitto Valley Medical Society was organized in Natchez, September 8. The districts include Adams, Amite, Franklin, Jefferson and Wilkinson counties, and the following officers were elected: president, Dr. Richard D. Sessions, Natchez; county vice-presidents, Adams County, Dr. Joseph D. Shields, Pine Ridge; Amite County, Dr. William R. Brumfield, Gloster; Franklin County, Dr. George T. Warren, Bude; Jefferson County, Dr. Leon R. Harrison, Fayette; and Wilkinson County, Dr. Columbus L. Field, Centerville; secretary-treasurer, Dr. Marcus Beckman, Natchez.

NEW JERSEY

New Officers.—Morris County Medical Society at Morris Planes, September 8: president, Dr. Frederick E. Knowles, Boonton; secretary, Dr. Henry W. Kice, Wharton.

Addition to Insane Hospital.—Plans have been adopted for an addition to the Overbrook Hospital for the Insane, Verona. The new building will have accommodations for 270 patients.

Measures against Anthrax and Glanders.—The State Board of Health, September 8, adopted regulations designed to prevent the importation of anthrax from Delaware, where cattle are said to be infected nearly every year.——The New Jersey State Health Department is securing from the Bureau of Animal Industry at Washington and forwarding to local boards of health throughout the state quantities of mallein to be used for the ophthalmic test on horses.

NEW YORK

Infantile Paralysis.—Cases of infantile paralysis are reported from Syracuse and Binghamton. The State Department of Health is taking every precaution to prevent the spread of the disease.

Personal.—Dr. Alexander Lowenstein has been placed in charge of the work of the Jewish Philatropic Society recently organized at Rochester.——Dr. Harold H. Fox, Springville, has been appointed medical adviser of Cornell University and assumed charge of his new office at Ithaca, September 20.——Dr. Wardner D. Ayer, Rensselaer, has been appointed pathologist to the Crouse-Irving University, Syracuse.——Dr. and Mrs. Francis R. Benham, Syracuse, have returned from abroad.

New York City

Personal.—Dr. and Mrs. John J. Moorhead and Dr. and Mrs. George Draper have returned from Europe.——Dr. Michael J. Thornton, for four years in charge of the psychopathic ward of Bellevue Hospital, has been appointed chief of staff of the psychopathic ward of the Kings County Hospital, Brooklyn, succeeding the late Dr. William B. Moseley.

Typhoid Epidemic in Brooklyn.—Up to September 12 there have been fifty-three cases of typhoid fever reported from the Park Slope section of Brooklyn, but since that time no new cases have been reported. The source of the infection has not been determined, and though many specimens of water have been examined, there is no indication thus far that the trouble lies in the water-supply.

New Requirement for Peddler's License.—The Department of Health and the Department of Licenses have determined to extend the scope of the medical examination now made of applicants for peddler's licenses and to include in each instance a Wassermann test. The physical examinations will be made in the tuberculosis clinics at present. Licenses will be denied to tuberculous persons whose sputum shows the presence of the tubercle bacilli and to those whose blood gives a double plus Wassermann reaction.

NORTH CAROLINA

New Hospital.—The construction work on St. Luke's Hospital, Newbern, being built by Drs. R. Duval Jones and Joseph F. Patterson is progressing rapidly and it is expected that the hospital will be opened before the end of the year.

Trachoma Investigation.—Dr. A. D. Foster of the United States Public Health Service, in his trachoma investigation in this state, has visited seventy-one white and thirteen colored schools, examining over 12,000 pupils and finding about thirty-cases of trachoma. The heaviest infection (eighteen cases) was found among the 207 pupils examined at the Indian school at Cherokee, Swain County; but this was also the only place where measures had been taken to determine the presence of the disease and to control its spread. The heaviest infection among whites was in Caldwell County, lighter infections being found in Cherokee and Mitchell counties. Only one negro was found infected. Dr. Foster believes that foreign immigration has played little or no part in introducing the disease here.

State Board Prizes.—The State Board of Health has offered six prizes of $25 each for the best articles on six health subjects written by citizens of the state. The subjects of the articles are, typhoid fever, malarial fever, diphtheria, scarlet fever, whooping-cough and measles. The prize essays will be published in the *Bulletin of the State Board of Health*. The contest is open to any citizen of North Carolina, who may compete for any or all of the prizes. The articles must be within one thousand to two thousand words, and the last day for filing the manuscripts for the competition will be, for typhoid fever, October 1; malarial fever, November 1; diphtheria, December 1; scarlet fever, Jan. 1, 1915; whooping-

cough, February 1, and measles, March 1. The judges of the competition will be the editor of the *Bulletin*, an editor of a city newspaper, a physician and a layman.

OHIO

New Hospital.—Plans have been completed for a new Jewish hospital, Cleveland, and construction is to begin October 15.

Protest Recognized.—The Logan County Medical Society, which protested its transferance by the council of the State Medical Society to the Dayton district, has been retransferred to its old district, known as the northwestern district.

"Baby's Health Is Cleveland's Wealth."—This is the slogan adopted by the child hygienic committee of Cleveland for "Baby Sunday," September 13. Every minister was requested to use the baby campaign as a theme for his sermon on that day. Lectures and exhibitions were given at the City Hall on September 14, and department stores also gave special window demonstrations on that day.

Citizens' Hospital for Barberton.—A very successful campaign to raise money for a hospital has just been terminated in Barberton. The hospital is to have a capacity of fifty beds, and $60,000 was raised. Over five thousand of the citizens own stock in the hospital, and it is to be known as the Citizens' Hospital Company. The hospital is to be self-supporting, and its equipment will be modern in every respect.

Small-Pox.—Small-pox continues to prevail in certain districts. The board of health of Sandusky is making a vigorous effort to rid that city of an outbreak which has lingered for some time. A meeting of all Sandusky physicians was called on September 9, and they were addressed by Dr. Frank G. Boudreau of the State Board of Health on the diagnosis and control of the present mild outbreak of small-pox. Dr. Boudreau afterward examined the Sandusky cases, of which there are three at the present time.

Director of Bureau of Juvenile Research Appointed.—Dr. Thomas H. Haines has been appointed chief psychologist of the new juvenile research bureau under the direction of the Ohio State Board of Administration. The position now occupied by Dr. Haines is an extremely important one, because of the large number of institutions under the care of the Ohio State Board of Administration. The new bureau will probably be located on the Ohio State University campus as a part of the proposed medical group.

Personal.—Dr. Charles H. Clark, superintendent of the Newburg State Hospital, Cleveland, has been appointed superintendent of the Lima State Hospital for the Criminal Insane. The new hospital is practically completed and will pass under the control of the State Board of Administration early in 1915.——Dr. Julius J. Buel, wife and daughter, Cleveland, have returned from abroad.——Dr. and Mrs. John J. R. MacLeod, will sail for home, September 19.——Dr. and Mrs. John Edwin Brown and son, Columbus, have returned from Europe.

District Health Officers for Ohio.—A bill to divide the state into health districts and to provide for whole-time, experienced district health officers, will be introduced at the next session of the general assembly. Each district will comprise one or more counties, and the county commissioners will act as a board of control. Only persons who have the degree of M.D., D.P.H., or some equivalent degree, will be eligible as candidates for the position of district health officers. All candidates will have to pass a civil service examination. The minimum salary is fixed at $2,000. In addition to the duties now performed by health officers and boards of health, the district health officer will be required to provide for medical inspection of schoolchildren, the inspection of workshops, factories and a complete system of milk and dairy inspection. District health officers will have jurisdiction everywhere except in incorporated cities.

OREGON

State Association Meeting.—The annual meeting of the Oregon State Medical Association was held in Portland, September 10 and 11, and the following officers were elected: president, Dr. Alpha E. Rockey, Portland; vice-presidents, Drs. Robert J. Pilkington, Astoria; William H. Dale, Harrisburg, and Robert J. Marsh, Portland; secretary, Dr. Marius B. Marcellus, Portland (reelected); treasurer, Dr. Katherine C. Manion, Portland (reelected); councillors, Drs. Joseph A. Pettit and Calvin S. White, Portland, and Francis G. Swedenburg, Ashland; delegate to the American Medical Association, Dr. Walter T. Williamson, Portland, and alternate, Dr. Kenneth A. J. Mackenzie, Portland.

PENNSYLVANIA

Diphtheria Epidemic.—A rather serious epidemic of diphtheria at Keystone Mines is under investigation by the State Health Department.

Leper in Wilkes-Barre.—The health authorities of Wilkes-Barre have been advised that Joseph Norman of that city, who went to Philadelphia recently, is suffering from tubercular leprosy. The house in which this man lived has been placed under quarantine.

Diarrheal Epidemic in the Coal Regions.—An epidemic of acute diarrhea has been reported from Freeland, Jeddo, Upper Lehigh, Eckley, Drifton and surrounding towns. Dr. Charles J. Hunt of the State Health Department, sent to the Luzerne coal regions to investigate the epidemic, reports September 1 that 1,000 cases have been found. An investigation of the cause is under way.

Philadelphia

Leprous Rats.—Two rats infected with leprosy germs have been discovered by the Department of Health in its campaign to clean the river front. The first rat with traces of leprosy was brought to the receiving station at Race Street pier, three weeks ago. The second, caught September 17, was found in a building near the wharf.

Personal.—Dr. Harry Lowenburg has returned from abroad.——Dr. and Mrs. G. Oram Ring have returned from the Mediterranean.——Dr. Laura Hunt has been appointed Professor of Otology at the Women's Medical College, to fill the position left by the death of Dr. Emma Musson.

New Ward Equipped.—A new ward for men and another for children has been equipped at the College Hospital, according to an announcement made at the opening exercises of the Woman's Medical College. The children's ward has been equipped largely by private donations, through the efforts of Dr. Theodore LeBoutillier and others.

WISCONSIN

Home from Europe.—Drs. Albert A. Maurer, La Crosse, and Frederick A. Kraft, Milwaukee, have returned from abroad.

Bacteriologist Appointed.—Miss Anna Stolzenfeld, as the result of a civil service examination, has been made first assistant bacteriologist in the Municipal Laboratory, Milwaukee.

New Officers.—Second District Medical Association at Lake Geneva, Wis., September 1: president, Dr. Gustave Windesheim, Kenosha; secretary, Dr. Milton V. Dewire, Sharon (reelected).

GENERAL

Life Insurance Directors Meet.—The annual meeting of the Medical Section of the American Life Convention will be held in Dallas, Texas, October 7.

Military Surgeons to Meet.—The twenty-third annual meeting of the Association of Military Surgeons of the United States will be held in Cincinnati, September 29 to October 2, with headquarters at Hotel Gibson.

Railway Surgeons Hold Meeting.—The railway surgeons of the Dakota, and Pierre and Rapid City divisions of the Chicago and Northwestern System met in Huron, S. Dak., September 16, at the call of Dr. John L. Foxton, district surgeon of the Dakota division, to meet the new chief surgeon of the system, Dr. George W. Hopkins, Chicago, and organized an association which will hold meetings once or twice a year.

Electrotherapeutists Meet.—At the twenty-fourth annual meeting of the American Electrotherapeutic Association held in Battle Creek, September 15 to 17, the following officers were elected: president, Dr. John W. Torbett, Marlin, Tex.; vice-presidents, Drs. Abram B. Hirsh, Philadelphia; Curran Pope, Louisville, Ky.; William Martin, Atlantic City, N. J.; Alfred J. Hopkins, Pittsburgh, and John S. Yates, Paterson, N. J.; secretary, Dr. John W. Travell, New York City (reelected), and treasurer, Dr. Emil Heuel, New York City (reelected).

Tuberculosis Conference.—The second Mississippi Valley Conference on Tuberculosis will be held at the Planters Hotel, St. Louis, October 6 to 8, in cooperation with the making of the National Association for the Study and Prevention of Tuberculosis. The purpose of the conference is to bring about a closer relationship between antituberculosis agencies in the Mississippi valley; to provide for the interchange of ideas and experiences, and to strengthen and extend the work

of the National Association and to arouse the people to the need for concerted action, both public and private, against the common foe, tuberculosis, and to bring about a closer cooperation between antituberculosis societies and other health agencies.

American Association for Study and Prevention of Infant Mortality to Meet.—The fifth annual meeting of this association will be held in Boston, November 12-14. The program will include sessions arranged by the committees on nursing and social work, pediatrics, vital and social statistics, obstetrics and public school education. Among the subjects to be discussed are included prenatal care, the need for increased and improved maternity hospital service, institutional mortality and continuation schools of home-making. The sessions will meet at the Harvard Medical School and at the Copley Plaza Hotel. Special clinics and an exhibit will be held in connection with the meeting.

Bequests and Donations.—The following bequests and donations have recently been announced:

The Western Reserve University Medical School Cleveland; a bequest of nearly $1,000,000, in memory of Albert Fairchild Holden, by the will of his father, Liberty E. Holden, Cleveland.

Massachusetts General Hospital, Boston, $1,000 by the will of H. R. Dalton.

Vincent Hospital, Boston, $3,000 by the will of J. B. F. Thomas, Boston.

Mt. Sinai Hospital, $2,000, and Hebrew Orphan Asylum, New York City, $1,000, by the will of Arthur Klein.

Brooklyn Bureau of Charities, German, Bushwick and Swedish Hospitals, each bequests varying from $900 to $1,800 by the will of Jacob W. Erregger.

American Theatrical Hospital, Chicago, donation of $5,000 by Jack Wilson to provide and equip an operating amphitheater, to be known as the Ada Lane Wilson Memorial.

Public Health in Porto Rico.—The chief of the public health service in Porto Rico, Dr. W. F. Lippitt, states that the mortality last year for the island was only 18.6 per thousand, a saving of 5,832 lives annually since 1911, when the service was organized. He declares that the change in conditions in regard to public health in such a brief period has never been surpassed and has scarcely been equaled in any country. The prompt way in which bubonic plague was stamped out when it got a foothold in the island in 1912 was the envy of other countries, especially as the effect was realized by the intelligent and energetic cooperation of the people. Dr. Lippitt has also recently sent a circular letter to all the members of the public health service saying that the sanitation service is not only for the purpose of keeping the streets clean, etc., but that it should take up all kinds of work bearing in any way on the public health, and consequently he urges each member to make a special study of some matter affecting the public health in his community, and offers the facilities of the laboratories for research or any other aid that may be required. He leaves each one free to select his own subject. The report when completed will be published in the official bulletin, credited to the author.

Plague in New Orleans.—Since the last report of bubonic plague published in The Journal of September 12, no cases of human plague have been discovered, but twenty-eight cases of rodent plague have been found, Nos. 86 to 114, inclusive, up to September 17. During the fortnight ended September 12, the Department of Outgoing Quarantine has fumigated 141 vessels with sulphur and 28 with carbon monoxid; has burned 25,116 pounds of sulphur; has consumed in carbon monoxid fumigation 32,890 pounds of coke; has inspected 40,017 tons of outgoing freight and 202,986 packages of freight; issued 81 clean and 8 foul bills of health. The Department of Overland Freight Inspection has inspected 6,573 cars; has rat-proofed 3,445 cars and has condemned 20 cars. No rodents were killed in cars during the fortnight. The Department of Field Operations has trapped 15,480 rats; has fumigated 7 premises; disinfected 145 premises; inspected 10,327 premises; has placed 515,715 poisons; has served 4,978 notices; has rat-proofed 560 buildings and has inspected 248 dead. The Department of Laboratory Examinations received 14,017 rodents, of which it has examined 9,996; 25 suspicious rats were found, and in 14 of these the diagnosis of plague was confirmed; 1 suspicious case of human plague was examined. The total number of rodents found up to September 12 was 79,543, of which 68,595 were examined.

CANADA

Health Officers of Nova Scotia.—At the recent meeting of the Medical Officers of Health of Nova Scotia, Dr. William H. Hattie, Dartmouth, provincial officer of health, presided. Among those who delivered addresses were Dr. Peter H. Bryce, Ottawa, and Dr. John W. S. McCullough, Toronto. Annual meetings will be held in the future.

Ontario Medical Association.—The next meeting of the Ontario Medical Association will be held in Peterborough in May, 1915. This meeting will be held in connection with the annual meeting of the Health Officers of Ontario. Dr. Thomas W. H. Young, Peterborough, is chairman of the Committee of Arrangements.

Personal.—Dr. W. E. Deeks has abandoned his trip to England, and is at present examining recruits in Montreal. ——Dr. Campbell B. Keenan, Montreal, has accepted the position of regimental surgeon to the Princess Patricia's Light Infantry. Dr. Keenan served through the South African war as surgeon to Strathcona's Horse.——Sir Thomas Roddick has returned to Montreal. At the outbreak of the war he was in Alsace, but reached London after a very trying journey. On his return to Montreal he contracted a cold which developed into pneumonia, from which he is now said to be recovering.——Dr. Robert Rudolf, Toronto, has gone to England, where he has been called to act as medical adviser to one of the base hospitals.——Hon. Dr. Beland, who has been doing good service in a medical capacity for the Belgians, has been appointed by the Dominon government to attach himself to Canada's first contingent.——Dr. George W. Ross, Toronto, has returned from Europe.

WAR NOTES

Madras Gives Hospital.—The government of Madras has offered a fully-equipped hospital ship with a capacity of 300 beds for the use of the Indian expeditionary force.

Red Cross Hospital Opened.—Two Washington physicians, Dr. Franz A. R. Jung and his wife, Dr. Sofie Nordhoff Jung, have established an American Red Cross Hospital in Munich, with a capacity of sixty beds.

Rations of War Prisoners in England.—The British War Office has stated the following as daily rations for war prisoners: bread, 1½ pounds or biscuits, 1 pound; fresh or frozen meat, 8 ounces or preserved meat, half ration; fresh vegetables, 8 ounces; butter or margarine, 1 ounce; condensed milk, one-twentieth of 1 pound tin; tea, one-twelfth ounce, or coffee, 1 ounce; sugar, 2 ounces; salt, one-half ounce.

Canadian Physicians Off for the Front.—It is probable that Lieut.-Col. Adam T. Shillington, Ottawa, will sail with the Canadian detachment, in charge of the Base Hospital, and with him will go Lieut.-Col. Robert L. Gardner and Drs. William P. Dillon, Charles A. Young, Neil McLeod, George Howlett Bell, Charles E. Preston, Theodore A. Lomer and James Seagar, all of Ottawa.——Dr. Edward J. Williams, Sherbrooke, Que., at present in command of the Sixth Cavalry Field Ambulance, has been appointed to duty in a stationary hospital in France.

Dr. Almroth E. Wright Recommends Antityphoid Vaccination.—In a letter to the London *Times*, Dr. Almroth E. Wright adds his influence to the movement for antityphoid vaccination for British troops. He suggests as the author of the method that it be made compulsory. Within the last three weeks he states a total of 180,000 doses of "antisepsis" vaccine have been supplied to the British army and navy and to the French military hospitals. Besides, the Department for Therapeutic Inoculation of St. Mary's Hospital, of which Dr. Wright is the head, has furnished as a contribution for the use of the British army nearly 280,000 doses of antityphoid vaccine.

Medical Congresses Postponed.—The following item is taken from *Deutsche medizinische Wochenschrift*, Aug. 13, 1914: "We have received from Professor Oppenheim the information that the Society of German Neurologists will omit the session of their society for this year. We may assume the same for all the other medical congresses, especially the Science Association (Naturforscherversammlung). Regarding the International Medical Congress which is planned for 1917, it is said that the German Executive Committee has already announced that further preparations for this meeting are discontinued. However, . . . it may be assumed with complete certainty that in 1917 the feeling of mutual embitterment will not yet have disappeared to a sufficient extent to permit a meeting of the representatives of those nations who are now threatening each other with destruction to take place and the usual speeches of greeting on the nation-binding power of science to be made in quiet."

Shortage of Medical Men in England.—*The Medical Press and Circular*, September 9, says that war has already absorbed a large proportion of what may be termed the floating section of the medical profession—that is to say, those of its members who are not engaged in private medical practice or in

one of the public services. Many newly qualified men are residents in hospitals, where they gain a valuable insight into professional work. Others of various ages act as assistants or do locum tenens work. Naturally many of this class have joined the army as surgeons on the comparatively liberal terms offered for service during the war—namely, 24 shillings a day, with allowances, and £60 grant at the end of the term of service. In addition not a few practitioners have thrown up their work and gone to the front. A large number of hospital surgeons have followed their example, with the result of a serious dislocation of medical practice throughout the Kingdom. Before the war there was a shortage of medical men, a deficiency that has now been seriously aggravated. Many asylums, poor law infirmaries and voluntary institutions are at their wits' end to find resident medical officers to carry out their routine work.

LONDON LETTER

LONDON, Sept. 9, 1914.

The War

As stated in my last letter, ample preparations have been made for the reception of the wounded in the various civil hospitals throughout the country and also in military hospitals, of which many are being established. At the London Hospital as many as 500 beds—250 for the army and 250 for the navy—have been offered and have been accepted. Three hundred wounded soldiers have arrived. They were taken from the railway station by a large party consisting of resident medical officers who acted as stretcher bearers and carriers. In consequence of the enormous crowds which gathered they were admitted by a back gate. Contrary to the rule of the hospital, they have been allowed to smoke in the wards, a privilege which they greatly appreciate. At Netley there is a great military hospital and military medical school. Here 800 soldiers from the front have been admitted. Some of them are sick, some suffering from sore feet and several hundreds from gunshot wounds. Hardly any of the wounds have been caused by rifle fire; most of them are due to shrapnel bullets. This is contrary to previous experience which is that wounds from rifle bullets are the commonest.

Inquiries of the government into the question of the drug supply have shown that, while in the case of many drugs, the prices of which have risen considerably, such shortage of stocks as exists is due to temporary and easily removable causes, in other cases a considerable period may have to elapse before the small supplies at present available in the country can be replaced. In the case of some drugs, as for example, the bromids, the shortage is due to the fact that the mineral deposits from which they are at present obtained are found chiefly in Germany, while in other cases, such as that of many synthetic remedies, the manufacture is largely carried on in that country. In other cases, again, the existing shortage is due only to the general interruption of sea-borne trade which accompanied the outbreak of war, and will be relieved as shipping communications are restored. The government has appointed a committee consisting of prominent physicians to consider questions arising in connection with the supply of drugs with special reference to the ways in which the medical profession can assist in effecting economies in the use of those drugs of which the supplies are small. A confidential circular has been issued by this committee to all physicians asking them as far as possible to conserve the stock by restricting the use of drugs of which the supplies are very small and not easily renewed. These drugs have been divided into two classes: those of which the stocks are very low and possibly cannot be replenished for a considerable time, and those which, though showing some shortage at present, can soon be replenished from ordinary sources or by opening alternative sources in a short time. The first group includes salicylates, bromids, potassium salts, glycerophosphates, liquid petrolatum, synthetic benzoic acid and its salts. It is suggested that salicylates should be reserved for the treatment of acute rheumatism and that for other diseases (influenza, neuralgia and conditions loosely termed rheumatic) other drugs be used. It is suggested that bromids be used only for epileptics, that sodium bicarbonate be substituted for potash salts, and sodium sulphate and phosphate for potassium tartrate and potassium sulphate; that for mouth washes and antiseptic gargles other substances than potassium chlorate be used; that syrupus ferri phosphatis and syrupus calcii lactophosphatis be substituted for glycerophosphates; that other laxatives be used instead of liquid petrolatum, and that benzoic acid be used only when a satisfactory substitute cannot be obtained. The second class consists of citric acid and tartaric acid, synthetic products (antipyrin, acetanilid, phenacetin, etc.), ergot, formaldehyd and its derivatives, hexamethylenamin and allied compounds and gentian root. It is suggested that instead of prescribing quinin in effervescent mixtures, acids be ordered, thus avoiding the use of citric and tartaric acid. With regard to the synthetics and analgesics it is suggested that their loss would be felt less if they were not used as antipyretics; that ergot be reserved for the treatment of post-partum hemorrhage; that formaldehyd be reserved for cases in which other disinfectants are inapplicable; that boric acid be used as a urinary antiseptic instead of hexamethylenamin and its allies, and that other bitters be used instead of gentian. The question of manufacturing some of the drugs hitherto obtainable solely from Germany is being seriously considered by manufacturers.

The protection of troops in the field against typhoid fever is receiving consideration. Army medical officers in charge of home depots, garrisons and camps are strongly urged to use all their influence in securing as many volunteers as possible for inoculation against typhoid fever. Sir William Osler has written to the *Times* in support of this. He thinks it would be very difficult to prevent outbreaks of dysentery and typhoid fever, of which in the South African War more died than were killed in action. He urges that antityphoid vaccination be made compulsory in the army.

Marriages

MARY VIRGINIA MCCUNE, M.D., Martinsburg, W. Va., to L. KISMET ROSSA, M.D., of Melbourne, Australia, at Harper's Ferry, W. Va., September 7.

FREDERICK B. CLARKE, M.D., Milwaukee, Wis., to Miss Agnes Myrle McCormick at Buffalo Ranch near Billings, Mont., August 31.

JOHN GRANT HARTWELL, M.D., Boston, to Miss Marion R. Gile of Colorado Springs, at her summer home in MacMahan, Me., September 2.

ROBERT BUCHANAN KENNEDY, M.D., New York City, to Miss Anna May Reimer of Rockland Lake, N. Y., September 5.

DANA FRANK CUMMINGS, M.D., Cherryfield, Me., to Mrs. Blanche Cyrene Ross Ray of Rockland, Mass., September 1.

BENJAMIN ALISON COCKRELL, M.D., Pineville, Ky., to Miss Harriet Tilghman Marimon of Valparaiso, Ind., September 2.

AUGUST HENRY ROSEBURG, M.D., Denison, Ia., to Miss Alexandria Zorin of San Diego, Cal., at Omaha, September 7.

CHARLES EDWARD PALMER, M.D., David City, Neb., to Miss Narcissa Houston Light of Cozad, Neb., September 1.

EDWARD EMMET POWERS, M.D., Rome, N. Y., to Miss Mary Catherine Reding of Dunkirk, N. Y., September 9.

ABRAHAM WILLIAM NELSON, M.D., Cincinnati, to Miss Helen Sebel of Avondale, Cincinnati, September 3.

JOSEPH S. DOUGHERTY, M.D., Lena, Wis., to Miss Josie O'Callighan of Iron Mountain, Mich., August 25.

WILLIAM ALOYSIUS DELANEY, M.D., to Miss Elizabeth C. McHenry, both of Mitchell, S. Dak., September 3.

CHARLES MERRILL ROSE, M.D., Galesburg, Ill., to Miss Marguerite Connery of Chicago, September 21.

JOHN WILLIAM BOREN, M.D., Marinette, Wis., to Miss Esther V. Johnson of Chicago, September 1.

GRIFFITH A. DEMAY, M.D., Indianola, Neb., to Miss Elsie Portz of Uniontown, Wash., September 4.

LOUIS SHALET, M.D., to Miss Elsa Helen Adeleine Müller, both of New York City, September 11.

WILSON GEORGE SMILLIE, M.D., Boston, to Miss Faye Anderson at Denver, Colo., September 2.

HARRY W. ROSENTHAL, M.D., to Miss Ruth A. Masbach, both of Baltimore, September 9.

DAVID NISAN RAPPOPORT, M.D., to Miss Bluma C. Bayuk, both of Philadelphia, August 28.

CHARLES EDWARD VIDT, M.D., Buechel, Ky., to Miss Bernice Hughes of Louisville, June 13.

FRANK P. DWYER, M.D., Renovo, Pa., to Miss Mary Howell of Altoona, Pa., July 29.

Deaths

Frederick Edwin Welsh, M.D. Northwestern University Medical School, Chicago, 1903; a Fellow of the American Medical Association; hospital steward of volunteers throughout the Spanish-American War, and a prominent practitioner and druggist of Boone, Iowa; who fell down through an open trap-door in his drugstore, September 3, sustaining a fracture of the base of the skull; died in the Eleanor Moore Hospital, Boone, September 5, from cerebral hemorrhage, aged 39.

Oscar R. Long, M.D. Detroit, Mich., Homeopathic Medical College, 1873; at one time a member of the faculty of the Homeopathic Department of the University of Michigan, Ann Arbor; for twenty-seven years medical superintendent of the Ionia State Hospital for the Criminal and Dangerous Insane, Ionia, Mich.; died at that institution September 9, from heart disease, aged 64.

William A. Curry, M.D. University of Virginia, Charlottesville, 1854; a veteran of the Mexican War; physician to the Missouri State Penitentiary; later for several terms a member of the legislature and state printer; founder of the *Missouri State Times;* died in the apartment of his daughter in Kansas City, Mo., July 28, from senile debility, aged 87.

Charles J. Bacon, M.D. Albany, N. Y., Medical College, 1865; founder and formerly president of the Lee Memorial Hospital, Fulton, N. Y., and consulting physician to the Oswego, N. Y., Hospital; for many years a practitioner of Fulton, but since 1910 a resident of Syracuse, N. Y.; died at his home, September 3, aged 70.

Byron Irvin Benedict, M.D. University of Iowa, Iowa City, 1907; of Chelsea, Iowa; a member of the Iowa State Medical Society; who was struck by a Northwestern train while going over a grade crossing at Chelsea, in his automobile, August 27; died from his injuries in Mercy Hospital, Cedar Rapids, Iowa, August 29, aged 31.

John Hudson Grant, M.D. Georgetown University, Washington, D. C., 1890; a member of the Medical Society of the State of New York; a veteran of the Civil War and formerly assistant state commissioner of agriculture of New York, with headquarters at Buffalo; died at his home in New York City, July 26, aged 70.

Henry E. Crepin, M.D. University of Illinois, Chicago, 1886; a member of the Arizona Medical Association; for two terms head of the health department of San Diego, Cal., and for several terms city health officer of Tucson and health officer of Pima County, Ariz.; died about August 25, at his home in Tucson, aged 52.

Francis M. Tate, M.D. Eclectic Medical College of Cincinnati, 1857; Eclectic Medical Institute, Cincinnati, 1874; a practitioner of Keokuk, Iowa, for more than forty years, and at one time a member of the faculty of Keokuk Medical College; died in Clarinda, Iowa, September 7, from cerebral hemorrhage, aged 84.

Stephen Dandridge Kennedy, M.D. University of Maryland, Ann Arbor, 1855; who entered the United States Navy as assistant surgeon, May 9, 1861; and after attaining the rank of medical inspector was dismissed the service, Nov. 20, 1883; died at his home in Cassilis, near Warrenton, Va., September 3, aged 70.

John Francis Halpin, M.D. University and Bellevue Hospital Medical College, New York City, 1899; a specialist on diseases of the throat and a member of the staff of the Easton District Hospital Dispensary, Brooklyn, N. Y.; died at the home of his sister in Brooklyn, September 4, from pneumonia, aged 37.

Leotos Lentz, M.D. Woman's Medical College of Pennsylvania, Philadelphia, 1914; of Wichita, Kan.; an intern in the Woman's Medical College, Philadelphia; died in that institution, June 8, as the result of poison self-administered, it is believed with suicidal intent, while suffering from melancholia, aged 29.

Thomas S. Nagle, M.D. Long Island College Hospital, Brooklyn, N. Y., 1870; a Fellow of the American Medical Association, a practitioner and druggist of Allentown, Pa.; died at his home in that city, about August 30, aged 67.

William Edward Barnard, M.D. Medical College of Alabama, Mobile, 1895; a member of the Medical Association of the State of Alabama; died at his home in Union Grove, Ala., about September 1, aged 33.

Sylvester Straut Bogert, M.D. College of Physicians and Surgeons in the City of New York, 1865; for forty years a practitioner of New York City, and one of the founders of the East Side Dispensary; died at his home in Pearl River, N. Y., July 26, from cerebral hemorrhage, aged 70.

Owen St. Clare O'Brien, M.D. Medical School of Maine, Brunswick, 1866; a surgeon of Volunteers both in the Army and Navy during the Civil War; a member of the medical staff of the Leander M. Haskins Hospital, Rockport, Mass.; died at his home in that city, September 1, aged 81.

Samuel Robinson Fife, M.D. Western Reserve University, Cleveland, 1862; for more than half a century a practitioner of West Elizabeth, Pa.; for one term postmaster; and a school director for more than forty-three years; died at his home in West Elizabeth, September 3, aged 81.

Frederick Bradley Downs, M.D. College of Physicians and Surgeons in the City of New York, 1878; a Fellow of the American Medical Association and formerly president of the Bridgeport, Conn., Medical Society; died at his home in Bridgeport, July 17, from diabetes, aged 58.

John H. Barr, M.D. Medical College of Georgia, Augusta, 1890; of Reed, Okla.; a member of the Oklahoma State Medical Association; who had his leg amputated a few weeks ago as the effect of an accidental gunshot wound; died recently at Portales, N. Mex., aged 54.

William French Phillips, M.D. University of Louisville, Ky., 1890; a Fellow of the American Medical Association; is believed to have committed suicide by hanging himself in the barn of his brother-in-law near his home in Morning Glory, Ky., September 10, aged 58.

Merritt W. Thompson, M.D. Rush Medical College, 1877; a Fellow of the American Medical Association; for many years a practitioner on the northwest side of Chicago; died at the home of his daughter in that city, September 8, from cerebral hemorrhage, aged 60.

Truman G. Wilkinson, M.D. Medico-Chirurgical College of Philadelphia, 1899; a member of the Medical Society of the State of Pennsylvania; formerly of Williamsport, Pa.; was found dead in an office in Reading, Pa., September 3, aged 36.

Louis M. Trulson, M.D. Northwestern University Medical School, Chicago, 1898; surgeon of U. S. Volunteers during the Spanish-American War; a prominent practitioner and mayor of Stoughton, Wis.; died at his home, September 4, aged 41.

Richard Thomas Freeman, M.D. Royal College of Physicians, Edinburgh, Scotland, 1865; for many years a surgeon on Pacific steamships; died on board the Pacific Mail Steamship *Pennsylvania*, July 14, two days out of Panama, aged 69.

John Schwendener, M.D. Northwestern University Medical School, Chicago, 1878; a Fellow of the American Medical Association and a well-known north-side physician of Milwaukee; died at his home in that city, August 31, aged 67.

Wallace J. Babin, M.D. University of the South, Sewanee, Tenn., 1905; a member of the board of aldermen of Kenner, La.; who was attacked and severely wounded by burglars several weeks ago; died August 26, from his injuries.

Cornelius T. Ford, M.D. New Orleans School of Medicine, 1861; of Mullins, S. C.; chaplain and regimental surgeon in the Confederate service throughout the Civil War; died in a hospital in Wilmington, N. C., August 24, aged 80.

Simeon O. Davis, M.D. Marion-Sims College of Medicine, St. Louis, 1895; formerly of Chandler, Okla., but for a few months a resident of Kent, Iowa; died at Unity Hospital, Creston, Iowa, August 30, from nephritis, aged 50.

Daniel F. Bell, M.D. University of Virginia, Charlottesville; University of Maryland, Baltimore, 1867; a Confederate veteran and a resident of Missouri since 1869; died at his home in Marshall, Mo., September 1, aged 74.

Sydney J. Weaver, M.D. Memphis Hospital Medical College, 1904; a member of the Arkansas Medical Society; for several years mayor of Fulton, Ark.; died at his home in that city, August 29, from pellagra, aged 43.

Arthur Burrows Rood, M.D. Syracuse, N. Y., University, 1889; a Fellow of the American Medical Association and an ophthalmologist of Minoa, N. Y.; died at his home in that city, August 27, from septicemia, aged 50.

J. Asbury Day, M.D. University of Louisville, Ky., 1911; of Prospect, Ky.; a Fellow of the American Medical Association; was drowned near Prospect, Ky., about August 28, aged 28.

John Jacob Louis, M.D. University of Michigan, Ann Arbor, 1881; for thirty-two years a practitioner and druggist of Haselton, Youngstown, Ohio; died at his home, September 6, from carcinoma of the liver, aged 66.

Lucinda Hall Corr, M.D. Northwestern University Woman's Medical School, Chicago, 1874; a member of the Illinois State Medical Society; died at her home in Carlinville, Ill., September 3, aged 70.

Margaret H. Van Tine, M.D. Eclectic Medical College in the City of New York, 1878; for forty years a practitioner of Brooklyn, N. Y.; died at the Home for the Aged in that city, September 3, aged 86.

Benjamin Clarence Senton, M.D. Harvard Medical School 1871; at one time captain in the National Guard, State of New York; died at his home in Roxbury, Boston, September 1, from heart disease.

Hesekiah Seymour Houghton, M.D. Bellevue Hospital Medical College, 1886; a Fellow of the American Medical Association; died suddenly at his home in New York City, September 11, aged 52.

Josiah Brodbury McKechnie, M.D. Medical College of Ohio, Cincinnati, 1862; formerly a practitioner of Wilmington, Ohio; died at his home in Kansas City, Mo., about August 25, aged 80.

Americus Langston Montgomery, M.D. Tulane University, New Orleans, 1887; a member of the State Medical Association of Texas; died at his home in Oak Cliff, Tyler, Texas, August 20, aged 54.

Elizabeth Corwin, M.D. New York Medical College and Hospital for Women, New York City, 1886; formerly of Binghamton, N. Y.; died at her home in Battle Creek, Mich., August 18, aged 62.

Matthew Sterling Borden, M.D. Bellevue Hospital College, 1898; of New York City; was instantly killed September 9, at Palmero, N. J., in a collision between his automobile and a freight train.

Luther E. Wysong, M.D. University Medical College, Kansas City, Mo., 1900; died at his home in Kansas City, Mo., September 2, from accidental poisoning by strychnin, aged 41.

Charles J. Holmes, M.D. New York University, New York City, 1868; of Gaylord, Kan.; died at the home of his daughter in Ponca City, Okla., July 10, from gangrene of the leg, aged 71.

David Knight Morton, M.D. Kansas City, Mo., Medical College, 1875; a Confederate veteran; died at his home in Kansas City, August 28, from cerebral hemorrhage, aged 73.

Levi Loar (License practitioner, Iowa, 1886), for forty years a practitioner of Selma, Iowa; a veteran of the Civil War; died in Davis County, Iowa, August 13, aged 79.

Young Jonathan Acton, M.D. University of Dublin, Ireland, 1886; once mayor of Bremerton, Wash.; died at his home in that city, August 30, from heart disease, aged 53.

Charles Franklin Barstow, M.D. Hering Medical College, Chicago, 1898; was found dead in his office in Freeport, Ill., August 30, from cirrhosis of the liver, aged 59.

Joel E. Bobo, M.D. Physio-Medical College of Indiana, Indianapolis, 1891; formerly of Fort Worth, Texas; died in his home in Topeka, Kan., August 27, aged 43.

James M. Arnold, M.D. Tulane University, New Orleans; for more than thirty years a practitioner of Houston, Texas; died at his home in that city, June 11, aged 78.

G. S. Montgomery (License practitioner, Iowa, 1886), formerly of Atlantic, Iowa; died at the home of his son in Red Oak, Iowa, about August 28, aged 74.

John W. Grindle, M.D. Eclectic Medical College in the City of New York, 1882; died at his home in New York City, September 2, from diabetes, aged 60.

George Ethelbert King, M.D. Kentucky School of Medicine, Louisville, 1898; died at his home in Wedonia, Ky., July 20, from tuberculosis, aged 40.

George W. Hudson, M.D. University of Maryland, Baltimore, 1875; died at his home in Camden, Ark., August 21, from pneumonia, aged 70.

Cassius M. Overhulse, M.D. Starling Medical College, Columbus, Ohio, 1892; died at his home in Holgate, Ohio, August 26, aged 56.

Robert J. A. Irwin, M.D. Western Reserve University, Cleveland, Ohio, 1824; of Pittsburgh, Pa.; died at his home September 1.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER MATTER TENDING TO AID INTELLIGENT PRESCRIBING AND TO OPPOSE MEDICAL FRAUD ON THE PUBLIC AND ON THE PROFESSION

SANATOGEN

A Scientific Investigation of Its Alleged Action on the Recuperating Powers of the Blood

Sanatogen, the new elixir of life compounded of casein and glycerophosphates, has been noticed in THE JOURNAL from time to time. It will be remembered that, while it has been claimed that "Sanatogen contains over 700 per cent. more tissue-building, life-sustaining nourishment than wheat flour," the facts are that one dollar's worth of wheat flour contains as much energy as one hundred and ninety-seven dollars' worth of Sanatogen! To this the manufacturers rejoin, in effect, that the casein and glycerophosphates in Sanatogen, being in chemical combination, possess a mystical and esoteric virtue not measurable in terms of the food-value of the several ingredients. The fact is, of course, that even assuming, for the sake of argument, that the ingredients of Sanatogen are in chemical combination, the compound cannot have any effect on the organism different from that of the uncombined casein and glycerophosphate, for the union must be of the loosest kind and must be broken up an soon as the preparation enters the digestive tract.

Testimonials are published in the Sanatogen "literature" which show results in a variety of conditions: cerebral concussion, alcoholic gastritis, anemia, etc. The patient is given a chance to recover with rest, proper diet—and Sanatogen. And the recovery which ensues is attributed to Sanatogen!

Not all of these testimonials are as naive as that of the Right Reverend the Bishop of Bath and Wells, who contributes the following bit of second-hand testimony:

"You may like to hear that I am informed by my private secretary that a member of his family has derived *very remarkable benefit* from using Sanatogen."

The following selections perhaps fairly represent the value to science of the clinical evidence offered. Describing a case of vomiting from cerebral concussion:

"I ordered an ice-bag to the head, a mustard leaf to the epigastrium, absolute recumbency in bed and small feeds of Sanatogen with water. This diet was continued for three days, but the vomiting ceased the second day."

And here a case of "hungry tired nerves":

"I have just had a recovery in a remarkable case which scores a victory for Sanatogen. The patient, a man 63, had been treated for some years past for heart trouble. When he came to me, however, I diagnosed his trouble as 'hungry tired nerves.' I put him on Sanatogen and eupeptics. In a month he was much improved."

In a serious case of the "American disease":

"I tried Sanatogen on a woman suffering from extreme neurasthenia and debility. For the past six weeks I have had, and still have, her under rest-cure treatment, during which time I have given her Sanatogen. I have been very much elated with the treatment."

Anemia in a girl of 23 working in a bookbindery:

"I promptly decided to use Sanatogen. In addition, I was able to secure the girl's absence from work so that she had the advantage of outdoor life and sunshine. Improvement was rapid. . . . Both apriori and from results obtained it seems almost justifiable to speak of Sanatogen as a specific in ordinary uncomplicated anemia."

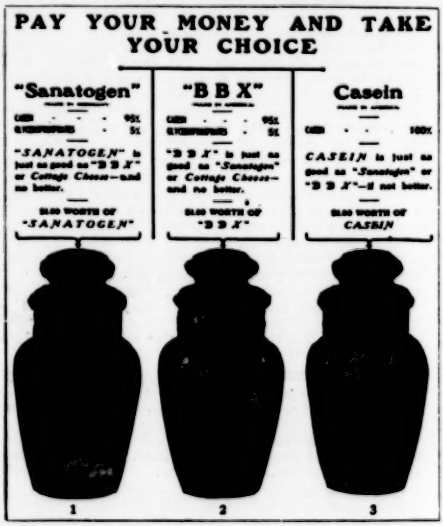
Note that in all these cases two or more remedial factors were introduced, yet any favorable result is promptly ascribed to only one factor, Sanatogen! And the factor of spontaneous improvement irrespective of all remedial measures is also ignored.

A "SCIENTIFIC" TESTIMONIAL

Every physician knows that the kind of evidence just quoted has the same scientific value as that of the average

"patent medicine" testimonial—none whatever. The exploiters of Sanatogen put forward some testimony, however, that purports to have a certain authority. This is a statement to the effect that "Sanatogen acts as a strong stimulus as far as the recuperative powers of the blood are concerned."

This claim is based on biologic experiments carried out by two physicians, Drs. G. Mann and J. G. Gage, the record of whose work was published in the *Lancet*, Oct. 19, 1912. The article of Mann and Gage was gone over with some care and the experiments there described did not seem to justify the conclusions reached by the authors. As it had been published in the *Lancet*, a medical journal of standing, whose publishers apparently thought it of sufficient importance to warrant the expense of a colored plate insert, it seemed worth while to have the work of Mann and Gage reviewed and its conclusions checked by parallel experiments. A. J. Carlson, professor of physiology at the University of Chicago, was asked to do this work and kindly undertook it. His report follows:


PAY YOUR MONEY AND TAKE YOUR CHOICE
"Sanatogen"
95%
5%
"SANATOGEN" is just as good as "B B X" or Cottage Cheese—and no better.
$1.00 WORTH OF "SANATOGEN"
"B B X"
95%
5%
"B B X" is just as good as "Sanatogen" or Cottage Cheese—and no better.
$1.00 WORTH OF "B B X"
Casein
100%
CASEIN is just as good as "Sanatogen" or "B B X"—it not better.
$1.00 WORTH OF CASEIN
1
2
3

Above is a photographic reproduction of one of the exhibits made at Atlantic City at the last annual meeting of the American Medical Association.

Jar 1 contains 3½ ounces of the casein-glycerophosphate combination made abroad and sold under the name "Sanatogen;" it costs One Dollar.

Jar 2 contains 2 pounds 13½ ounces of a casein-glycerophosphate combination made by an American casein company; it costs One Dollar. For the same money, then, one gets nearly 15 times as much of this casein-glycerophosphate combination made in America as when the casein-glycerophosphate combination is sold under the name "Sanatogen" and manufactured abroad.

Jar 3 contains one dollar's worth of pure casein. The casein entirely fills the jar, although the weight of the material is the same as the weight of the casein-glycerophosphate combination in Jar 2. Pure casein is more bulky than the casein-glycerophosphate combination.

Again we would emphasize that the chief objection to Sanatogen is not its high price but the fraudulent claims under which it is sold.

Report of Professor Carlson

I am asked to review the work done by Drs. G. Mann and J. G. Gage, from which they draw the following conclusions:

"Sanatogen [sodium caseinogenate glycerophosphates] further stimulates blood-cells to undergo nuclear division, which during the early period is mostly amitotic. . . . Therefore, it is evident that Sanatogen acts as a strong stimulus as far as the recuperative powers of the blood are concerned."

Three series of experiments were made and reported by Drs. Mann and Gage, comparing the histology of the blood in starvation and during the height of digestion. The experiments of the first series were made on six students, the starvation period being thirty-six hours, ordinary food being taken after the thirty-six hours' fast, so far as can be gathered from Dr. Mann's report. It was found that during the height of digestion the nuclei of the lymphocytes and leukocytes stain more deeply, and that there is a slight decrease in the cytoplasm and consequent diminution in the size and number of the granules of the neutrophil and the eosinophil cells, in comparison with the blood during fasting.

The experiments of the second series were made on 100 frogs that had starved for months, blood-films being taken at varying periods after feeding 1 gm. Sanatogen. The changes noted in the white blood-cells of the frogs were practically identical with those described in the case of the six students. Increased cell division is stated to occur. The nuclei of the erythrocytes stain more deeply and the cells are increased in size, and exhibit increased cell division twenty-four hours after the feeding.

The third series consisted of one experiment on Dr. Mann himself. He fasted twenty hours and then took 15 gm. of Sanatogen in a cup of water. Practically the only change noted in the blood after the feeding was a deeper staining of the nuclei of the white cells. To quote:

"The changes in the granules of the polymorphonuclear leukocytes and in the eosinophils were much less marked than in the specimens supplied by the students, and the diminution in the size of the white cells was so insignificant as to be hardly noticeable."

Assuming that the blood-changes reported are correct, is the conclusion warranted that Sanatogen is a powerful recuperative stimulant to the blood?

In the first place, it remains to be proved, for there is as yet positively no evidence that the deeper staining of the nuclei during digestion and absorption of a protein meal represents "recuperative power of the blood" or processes of "feeding" on the part of the white cells. The actual significance of these changes requires further investigation. The increased division of the blood-cells described by Dr. Mann in the frogs was not observed by him in man. This phenomenon in the frogs is, in all probability, associated with the extraordinary length of the starvation period (months) and the well-known seasonal variations in the physiology of this species.

In the second place, waiving for the moment the question of the significance of the blood-changes observed, the evidence, so far as it goes, points to the conclusion that the greater affinity of the nuclei of the white cells for the stain is brought about by the feeding of any protein food. The experiments do not demonstrate any different or more marked effect from Sanatogen than from other protein foods.

The test on the six students with ordinary food can be considered as a control on the single Sanatogen test on Dr. Mann himself. The blood-changes in the students were more marked than in Dr. Mann.

Although Mann and Gage say that six frogs were used as controls, they do not say how the controls were treated, or draw any comparison between the controls and the frogs fed with Sanatogen. So far as the report goes, therefore, the only basis for comparison is afforded by the work of one of Dr. Mann's pupils, H. G. Butterfield. This worker, as quoted by Mann, found that on feeding newts after two weeks' starvation with a worm the size of a wooden match, the nuclei of all tissues (excepting nerve cells) take a much deeper stain than in the control animals. To pronounce Sanatogen, on the basis of the facts reported, a "powerful stimulus" to blood-formation is a piece of special pleading, if not of downright disingenuousness. Considered on its own merits, the work would not have appeared to me worthy of being repeated for the purpose of checking up such obviously unwarranted conclusions. In order to comply with the request made of me, however, I have repeated Dr. Mann's experiments:

EXPERIMENTS BY PROFESSOR CARLSON

I. TESTS ON MAN (A. J. C.)

1. 36 hours' fast followed by a meal of 25 gm. Sanatogen in water.
2. 36 hours' fast followed by a meal of 25 gm. casein in water.
3. 36 hours' fast followed by a meal of 200 c.c. of milk.

II. TESTS ON RATS

1. 4 animals, 72 hours' fast followed by a meal of Sanatogen in water.
2. 2 animals, 72 hours' fast followed by a meal of crackers and milk.

3. 2 animals, 72 hours' fast followed by a meal of casein in water.
4. 2 animals, 72 hours' fast followed by a meal of casein and sodium glycerophosphate in water.

Blood-films were taken at intervals during the fasting period and for twenty-four hours after feeding was resumed. The technic of fixing and staining given by Drs. Mann and Gage was followed in every detail in order to make my results comparable with their findings.

RESULTS

My results may be summarized as follows:

1. The only change in the blood-cells that could be detected with certainty in rats or in man, after feeding with Sanatogen or after feeding with other foods, was a deeper staining of the nuclei of the white cells in the films taken after feeding as compared with the films taken during fasting. This difference is generally distinct and unmistakable, although individual cells can always be found in the fasting and the feeding preparations that show no difference in affinity for the dyes. To this extent my results confirm those of Mann and Gage. I was not able, however, to make out any constant difference in the size of the cells, quantity of cytoplasm, or size and number of cytoplasmic granules similar to those reported by Mann and Gage.

2. There was no difference in the affinity for stains on the part of the white blood-cells in films taken after feeding Sanatogen and those taken after feeding milk, crackers, casein, and casein and sodium glycerophosphate. This is true for the tests both on man and on rats.

3. The above-mentioned difference in the staining of the cell nuclei was somewhat more marked in the tests on rats than in the tests on man, probably owing to the longer starvation period in the case of rats.

It has already been stated that the significance of this increased affinity for dyes in the nuclei of the white blood-cells must be determined by further investigation. It may be related to the change in the titration alkalinity of the blood rather than an evidence of "recuperative power" on the part of the blood, as it is well known that starvation induces acidosis, while during digestion the alkalinity of the blood is distinctly increased. If we assume that increased staining reaction during digestion indicates "increased recuperative power of the blood" it follows that such common and inexpensive foods as milk, crackers and casein are just as "powerful stimuli" to this recuperation as Sanatogen.

The extensive researches of Mendel and Osborne have shown that casein is in a certain sense a perfect food in that it is, in normal animals, capable of promoting growth and maintaining nitrogenous equilibrium, at least for long periods of time. The burden of proof, however, rests with the promoters of Sanatogen to show that the casein in Sanatogen is superior to the natural product of the cow.

Conclusion

From the findings in Professor Carlson's report on this disguised puff of a mendaciously exploited proprietary, about all that remains to be said is that it is humiliating to find such pseudo-science not only built up by members of a profession trained in science, but also given currency and authority by a medical journal of high standing.

The Character of Lister.—In the midst of his great triumph Lister preserved, unstained from the breath of vanity, the noble qualities of character that were his. He was ever gentle, courteous and firm. Trying as are the exactions and responsibilities of an important surgical post, Lister was never known to speak a sharp word to house surgeon, dresser or any one in his service. His scientific spirit and discovery attracted the curiosity of the students and young graduates of Edinburgh; his personal nobility won their hearts. His art of winning their loyalty was by inspiring enthusiasm and giving encouragement. "Often in the middle of a trying operation," wrote one of his pupils, "a gentle smile bestowed on us young students when we were honestly trying to do our best as assistants was most encouraging." Many of his students afterward confessed that their contact with Lister was the best and purest influence of their lives.—G. T. Wrench, *Lord Lister, His Life and Work.*

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted on request.

FORMULAE FOR LIQUID SOAP

To the Editor:—I would be pleased to have you criticise the following formula for making liquid soap.

	gm. or c.c.
Sodium hydroxid	80
Potassium hydroxid	80
Cottonseed oil	1,000
Alcohol	500
Water	2,500

Dissolve the hydroxids in 500 c.c. of water. After solution has been effected, add the alcohol, and, finally, the cottonseed oil in several portions, and shake thoroughly until saponified. Finally add water sufficient to make ————.

To the soap liquid thus prepared add:

	gm. or c.c.
Potassium carbonate	30
Terpineol	12
"Evergreen A," sufficient to produce a grass-green color.	

We have been trying to make this soap for use in the operating room, but have never succeeded in making a clear solution with the formula as it stands; there has always been an insoluble residue left. I would be specially pleased to know if the quantity is to be "q. s." 2,500 c.c. or if enough water should be added after the addition of 2,500 c.c. to make complete solution.

A. E. CONTER, M.D., Chattahoochee, Fla.

ANSWER.—The trouble encountered is probably due to the fact that saponification was not complete before the addition of the remaining portion of water. The procedure should be modified to take advantage of the heat generated by the solution of the caustic alkalies in the mixture of water and alcohol, deferring the addition of the final portion of water until after all the oil has been thoroughly saponified. Add the sodium hydroxid and potassium hydroxid to 500 c.c. of water in a suitable container, add one-half the quantity, or 250 c.c., of the alcohol; then add the oil gradually with constant stirring or occasional shaking, and after a uniform emulsion has been formed allow to stand until the mixture is practically transparent, indicating that the oil has been thoroughly saponified; then add the remaining portion of alcohol and 2,500 c.c. of water. This should readily make 3,000 c.c. or more of the liquid soap which, while slightly alkaline, is not objectionably so.

A simpler formula has been suggested by Mr. Thum of the German Hospital of Philadelphia. This formula is somewhat more economical and produces a soap that is less alkaline in reaction. It may be flavored and colored to suit:

	gm. or c.c.
Sodium hydroxid	55
Potassium hydroxid	65
Cottonseed oil	800
Alcohol	500
Water to make	5,000

Dissolve the hydroxids in 60 c.c. of water, add all of the oil and 100 c.c. of alcohol at once and stir continuously until a permanent emulsion has been formed; allow to stand until saponification is complete and add remainder of alcohol, and water sufficient to make up the volume.

USE OF TALCUM POWDERS

To the Editor:—1. Can you inform us whether talcum powder possesses any therapeutic value in the treatment of skin affections?

2. What is the effect of plain talc on the skin? Why is it good for the skin, if it is good?

3. Exactly what is the effect of boracic acid on the skin?

4. About what proportion of boracic acid to talc should a talcum powder contain to be most beneficial?

5. What is the effect on the skin of any other ingredients contained in talcum powder?

6. Do you know of any investigations made, or have you had any experience, as to the comparative value of different commercial talcum powders, and what did such investigations and experience disclose?

J. WALTER THOMPSON COMPANY, New York.

ANSWER.—1 and 2. The effect of any powder on the skin can only be somewhat protective and dehydrating. On the other hand there is a tendency to the formation of crusts and pastes, due to mixture of the powder with sweat or other secretions.

3. The effect of boracic acid is slightly antiseptic, but there is some doubt as to even this slight value when the chemical is applied in powder form.

4. The salicylated talcum powder of the National Formulary contains 10 per cent. boric acid. The importance of this powder depends rather on the salicylate, however, than on the other ingredients. Various commercial talcum powders contain small quantities of different antiseptic and perfuming agents. For absorbent purposes by far the most effective powder is magnesium carbonate powder.

5. In general it may be stated that talcum powders seem to have but little value from a therapeutic point of view, and their value esthetically must be considered entirely from the point of view of the individual employing them.

REFERENCES TO PSYCHANALYSIS

To the Editor:—Please explain or refer me to an explanation of psychanalysis. J. A. BALSLEY, M.D., Santa Monica, Cal.

ANSWER.—The following is a list of references on this subject:

BURROW, T.: The Psychanalyst and the Community, THE JOURNAL, June 13, 1914, p. 1876.

DERCUM, F. X.: The Evaluation of the Psychogenic Factors in the Etiology of Mental Disease, including a review of Psychanalysis, THE JOURNAL, March 7, 1914, p. 751.

CORIAT, I. H.: Interpretation of Imaginative Creations by Psychanalysis, THE JOURNAL, Feb. 8, 1913, p. 464.

BRILL, A. A.: Psychanalysis, Ed. 2, Philadelphia, W. B. Saunders Company, price $3.

JONES, E.: Papers on Psychoanalysis, New York, William Wood & Co., price $4.

SOLOMON, M.: Psychoanalysis, *New York Med. Jour.*, May 9, 1914.

JELLIFFE, S. E.: Technic of Psychoanalysis, *Psychoanalytic Rev.*, Nov. 1, 1913.

PUTNAM, J. J.: Broader Issues of Psychoanalytic Movement, *Am. Jour. Med. Sc.*, March, 1914.

JANET, P.: Psychoanalysis, *Jour. Abnorm. Psychol.*, April and May, 1914.

PUTNAM, J. J.: Dream Interpretation and Theory of Psychoanalysis, *Jour. Abnorm. Psychol.*, April and May, 1914.

ENGELEN, P.: Psycho-Analysis, *Deutsch. med. Wchnschr.*, Oct. 16, 1913.

OBERNDORF, C. P.: Scope and Technic of Psycho-Analysis. *Med. Rec.*, New York, Nov. 29, 1913.

EDER, M. D.: Present Position of Psycho-Analysis, *Brit. Med. Jour.*, Nov. 8, 1913.

TANNENBAUM, S. A.: Psychoanalysis, *New York Med. Jour.*, Feb. 7, 1914; *Med. Rec.*, New York, Feb. 21, 1914.

SCRIPTURE, E. W.: What is Psychanalysis? *Med. Rec.*, New York, April 26, 1913.

BECKER, W. F.: Psycho-Analysis, *Wisconsin Med. Jour.*, May, 1913.

HESNARD, A.: Freud's Method of Psychanalysis, *Jour. de méd. de Bordeaux*, May 25, 1913.

FORSYTH, D.: Psycho-Analysis, *Brit. Med. Jour.*, July 5, 1913.

BURROW, T.: Psychologic Analysis of So-Called Neurasthenic and Allied States, *Jour. Abnorm. Psychol.*, October, 1913.

MILK OF MAGNESIA—LACTOSE OR GLUCOSE IN URINE

To the Editor:—1. Please give a formula for making milk of magnesia.

2. I have a patient who is six months pregnant; her urine gives a very decided yellow precipitate with Fehling's solution. Is there any way to determine if this is lactose or glucose except with a polariscope? We have no polariscope. B. S. A.

ANSWER.—Milk of magnesia is a synonym for magma magnesiae, an aqueous suspension of magnesium hydroxid, made by reaction between magnesium sulphate and sodium hydroxid (see National Formulary). Each teaspoonful contains about 3 grains of magnesium hydroxid. It is used as an antacid and mild laxative in adult doses of 8 c.c. (or 2 fluidrams). Unless made with water free from iron and organic matter, the magma is likely to be discolored.

2. If a specimen of urine reacts with Fehling's solution and with Nylander's test, but fails to give a reaction with phenylhydrazin and does not ferment with yeast, the presence of lactose may be inferred. If the urine be boiled with 2 per cent. sulphuric acid and then neutralized, its optical activity will be increased and it will be capable of undergoing fermentation.

DEFINITION OF A CORONER'S CASE

To the Editor:—When is a case a coroner's case in New York State? X. Y. Z., New York.

ANSWER.—Chapter 410, Section 1773, Laws of 1882, reads as follows: "If a person dies from criminal violence or by a casualty, or suddenly while in apparent health, or when unattended by a physician or in prison, or in any suspicious or unusual manner, the case must be referred to the coroner."

Medical Education and State Boards of Registration

COMING EXAMINATIONS

COLORADO: Denver, October 6. Sec., Dr. David A. Strickler, Empire Bldg., Denver.

DISTRICT OF COLUMBIA: Washington, October 13-15. Sec., Dr. George C. Ober, 125 B St., S. E., Washington.

GEORGIA: Atlanta, October 13-15. Sec., Dr. C. T. Nolan, Marietta.

IDAHO: Wallace, October 6. Sec., Dr. John F. Schmershall, Jerome.

ILLINOIS: Chicago, October 6-8. Sec., Dr. C. St. Clair Drake, Springfield.

KANSAS: Topeka, October 13-15. Sec., Dr. H. A. Dykes, Lebanon.

LOUISIANA: New Orleans, October 29-31. Sec., Dr. E. L. Leckert, New Orleans.

MICHIGAN: Lansing, October 13-15. Sec., Dr. Beverley D. Harison, 504 Washington Arcade, Detroit.

MINNESOTA: Minneapolis, October 6-9. Sec., Dr. Thomas McDavitt, Lowry Bldg., St. Paul.

MISSISSIPPI: Jackson, October 27-28. Sec., Dr. E. H. Galloway, Jackson.

MISSOURI: Kansas City, September 28-30. Sec., Dr. J. A. B. Adcock, State House, Jefferson City.

MONTANA: Helena, October 6. Sec., Dr. William C. Riddell, Helena.

NEW JERSEY: Trenton, October 20-21. Sec., Dr. H. G. Norton, Trenton.

NEW MEXICO: Santa Fe, October 12. Sec., Dr. W. E. Kaser, East Las Vegas.

OKLAHOMA: Muskogee, October 6-8. Sec., Dr. John W. Duke, Guthrie.

RHODE ISLAND: Providence, October 1-2. Sec., Dr. Gardner T. Swarts, State House, Providence.

WEST VIRGINIA: Clarksburg, October 13. Sec., Dr. S. L. Jepson, 81 Twelfth St., Wheeling.

WYOMING: Kemmerer, September 28-30. Sec., Dr. H. E. McCollum, Laramie.

Pennsylvania June Report

Dr. N. C. Schaffer, secretary of the Bureau of Medical Education and Licensure of Pennsylvania, reports the written examination held at Philadelphia, June 1-2, 1914. The total number of subjects examined in was 5; total number of questions asked 50; percentage required to pass 75. The total number of candidates examined was 78, of whom 65 passed and 13 failed. The following colleges were represented:

College	PASSED	Year Grad.	Total No. Examined
University of Southern California		(1912)	1
Georgetown University		(1913)	3
Chicago College of Medicine and Surgery		(1911,1); (1913,1)	2
University of Louisville		(1913)	1
Baltimore Medical College		(1910,1); (1913,1)	2
Johns Hopkins University		(1912)	1
Maryland Medical College		(1912,5); (1913,1)	6
University of Maryland		(1903)	1
New York Homeo. Med. Coll. and Flower Hospital		(1912)	1
Starling-Ohio Medical College		(1913)	1
Hahnemann Med. Coll. and Hosp., Phila.		(1912,1); (1913,7)	8
Jefferson Medical College		(1912,1); (1913,11)	12
Medico-Chir. Coll. of Phila.		(1912,2); (1913,12); (1914,1)	15
Temple University		(1912)	1
University of Pennsylvania		(1912,3); (1913,4)	7
University of Pittsburgh		(1913)	1
University of Toronto		(1911)	1
Kaiser-Wilhelms University, Germany		(1913)	1

College	FAILED	Year Grad.	Per Cent.
University of Louisville	(1911) 58.8, 72;	(1913)	63.8
Maryland Med. Coll.	(1912) 63.4, 61.8, 62.2;	(1913) 64.2,	62.6
Hahnemann Medical Coll. and Hosp., Phila.		(1913)	71
Woman's Medical College of Penna.		(1910)	72
Royal University of Naples, Italy	(1895) 64.4;	(1913)	68.8
National University of Athens, Greece		(1910)	69.8

The following questions were asked:

PHYSIOLOGY, PATHOLOGY AND BACTERIOLOGY

1. Describe the lesions in typhoid fever. Outline the laboratory tests for verifying the diagnosis. 2. Describe the lesions, name the causes and outline the laboratory technic for demonstrating the varieties of inflammations of the eyes of the newborn. 3. Give a case of incipient tuberculosis of the lungs. Outline the laboratory tests that would aid in confirming the diagnosis. 4. Give an acute case of peritonitis (a) how are the toxins absorbed? (b) discuss the rationale of the sitting position and enteroclysis in the treatment of the above condition. 5. Given a case of gonorrheal infection, describe the heart lesions that may result. Contrast the disturbed functions of such a heart with the functions of a normal heart. 6. Contrast the blood-picture in leukemia and pernicious anemia with that of normal blood. 7. Describe the lesion in (a) gastric ulcer; (b) carcinoma of the stomach. Differentiate these lesions by laboratory methods. 8. Differentiate, by an examination of the spinal fluid, the various forms of meningitis. 9. Name two pathologic

conditions that usually have icterus as a symptom. What is the significance of icterus, (a) as regards the liver? (b) as regards digestion? 10. Briefly describe the types of gangrene. What is understood by the "line of demarcation?"

DIAGNOSIS, SYMPTOMATOLOGY, TOXICOLOGY AND MEDICAL JURISPRUDENCE

1. Describe the symptoms of the various forms of asthma, and differentiate them from chronic bronchitis. 2. State in detail the symptoms diagnostic of ileus, and name four conditions which may cause it. 3. Describe the symptoms of diphtheria and differentiate it from follicular tonsillitis. 4. State the symptoms of rubella (Roetheln) and differentiate it from measles, scarlet fever and urticaria. 5. Describe the symptoms diagnostic of gonorrheal arthritis, and differentiate it from tubercular joint. 6. State the symptoms of iritis and differentiate it from glaucoma and keratitis. 7. Differentiate aortic regurgitation from mitral regurgitation. 8. Enumerate the symptoms of a poisonous dose of (a) bichlorid of mercury; (b) aconite; (c) arsenic. Give the immediate treatment for each one. 9. On what data would you base a diagnosis of (a) syphilis? (b) tetanus? (c) gonorrhea? Name one laboratory test for each. 10. What precautions, from a medicolegal standpoint, should the physician or surgeon exercise when treating fractures or dislocations?

OBSTETRICS, GYNECOLOGY AND PHYSIOLOGICAL CHEMISTRY

1. Enumerate the causes of backward displacement of the womb, (a) in nulliparas, (b) in multiparas. Discuss the treatment in each case with reasons for the same. (Omit description of operation). 2. Give the methods of making an early diagnosis of cancer of the uterus, (a) cervix, (b) fundus. Outline an appropriate treatment for each. (Omit description of operation.) 3. Outline a satisfactory preparatory treatment for plastic operations on the vagina, giving reasons for each step. 4. Name four abdominal enlargements which may be mistaken for advanced pregnancy (seven months or more) and differentiate each from such possible pregnancy. 5. State the probable causes of vomiting of pregnancy. What methods would you adopt for its relief and state the theory on which you would use the remedies advised. 6. Given a pregnant woman (the first three months), what symptoms would indicate a possible abortion? In case the abortion occurred, how would you treat the case? (Omit description of operation.) 7. Discuss the various toxemias of pregnancy from the viewpoint of premonitory symptoms. Discuss their treatment (a) prophylactic, (b) after having become well established. 8. Give arguments for and against the so-called low protein food standard. 9. Explain the relationship between the pigment of the blood, bile and feces. 10. Explain the processes of physiological chemistry by which indican is ultimately eliminated and where is it ultimately found.

SURGERY AND ANATOMY

1. State the avenues and possible points of metastasis of a malignant growth of the breast. On what symptoms may an early diagnosis of cancer of the breast be based? 2. State (a) what structures may be injured in a subcoracoid luxation of the humerus. (b) How may this condition be recognized? (c) How may it be corrected? 3. Name three usual causes of rectal strictures. Outline (without details) a palliative operation for this condition. 4. Enumerate (without explanations or details) conditions which might exist in a patient tending to complicate and render more dangerous a surgical operation. 5. What conditions would call for catheterization of the male bladder? Describe in detail a proper method. 6. Describe (a) a method of preventing surgical shock; (b) its treatment. 7. In the case of an abdominal operation, give in detail (a) a method of preparing the patient; (b) the surgeon. Give reasons for each step. 8. Outline (a) methods of prevention; (b) the treatment of bed sores. 9. In fractures of the upper third of the femur, what is the usual position of the fragments? What muscular action causes the same? 10. What anatomic structures are involved in flat-foot? What methods of treatment would you adopt for its correction?

PRACTICE AND THERAPEUTICS AND MATERIA MEDICA, HYGIENE AND PREVENTIVE MEDICINE

1. Describe the therapeutic action of suprarenal gland, thyroid gland and pituitary body. 2. Outline the management of a case of syphilis in both the primary and tertiary stages. 3. Name two remedies and the indications for their use in each of the following conditions: 1, impetigo contagiosa; 2, scabies; 3, tapeworm; 4, hemoptysis; 5, croup (non-diphtheritic). 4. Name and describe three methods for the purification of water intended for drinking purposes. 5. On what theories or principles are cold baths and cold sponging resorted to? State the indications calling for such measures. 6. Give in detail the dietetic and hygienic rules and regulations you would prescribe in a case of diabetes mellitus. 7. Outline the management of a case of nocturnal enuresis. 8. Explain the difference between the principles underlying vaccine therapy and serum therapy. State the character of danger in their application to the human body. 9. What errors in diet or hygiene or occupational conditions may cause or aggravate acute eczema? Write a prescription for a suitable application stating the special purposes expected to be accomplished. State one drug to be used internally, with the reasons for its employment. 10. Give the hygienic measures tending to prevent epidemic "colds." Give the management of an acute attack, including three remedies and reasons for their use.

What is Scholarship?—The answer is: The discovering, the organizing and the explaining of new facts. Only the uninformed and unscholarly are in the habit of designating the mere diffusion of knowledge as scholarship.—F. C. Brown, —*Science.*

Book Notices

RADIUM AND RADIOTHERAPY. Radium, Thorium and Other Radio-Active Elements in Medicine and Surgery. By William S. Newcomet, M.D., Professor of Roentgenology, Temple University. Cloth. Price, $2.25 net. Pp. 315, with 72 illustrations. Philadelphia: Lea & Febiger, 1914.

The knowledge of radium introduces the physician to a strange world. When one begins to talk of transformations of one element into another, the chemical ideas in which many physicians now in practice were educated are outraged; and when the exact length of life of elements varying from two minutes to 8,000,000,000 years is calculated, one can only wonder what science will next bring forth. It must be acknowledged that radium is a powerful agent and at the same time a dangerous one, and if the physician is to handle this new power he must have a thorough knowledge of its capabilities and limitations. This means that he must have a new education in a large field of chemistry. Owing to the cost of the material this knowledge can be gained by approved methods of experimental science only to a limited extent. Text-books must be resorted to, and for this purpose the present work is very well adapted. The practical consideration of the therapeutic use of the radio-active elements is conservative, but up to date. The author gives the following estimate of the value of these preparations in internal medicine:

"The exact status of these radio-active elements in internal medicine is by no means a settled question; perhaps the observations in some instances have been greatly exaggerated; yet, at the same time, from an experimental standpoint these elements produce changes which have been noted by most careful observers, who practically agree on the salient points, and from their deductions it is rational to adopt some of the conclusions which have brought about the application of these elements. But as most of the diseases in which they have been employed belong to a class for which certain forms of treatment have been periodically promulgated, to be used for a short time and finally be forgotten, more proof must be given of their efficiency before they can be universally adopted."

This book will be found serviceable to medical men, both to those who are using or who propose to use radium as well as to those who want to familiarize themselves with all knowledge regarding it.

THERAPEUTICS, DIETETICS AND HYGIENE. An Australian Text-Book. By John William Springthorpe, M.A., M.D., M.R.C.P., Senior Physician to the Melbourne Hospital. Two Volumes. Cloth. Price, 25 shillings net per volume. Pp. 1120, with illustrations. Melbourne: James Little, 1914.

Australia is a new continent with new ideals which extend to the domain of medicine and hygiene as well as to politics and sociology. Among the physical ideals is the hope that by the culture of a pure white race a state of physical perfection may be attained which will outstrip anything that the world has yet seen. Dr. Springthorpe has entitled his work an Australian text-book, intimating at least that it expresses something of the high aims of Australian medicine. It is published in two volumes. One characteristic of the author's work is the attempt to correlate the psychic and the physical and to base his science as well as his practical methods on a philosophy which recognizes mind associated with matter, if not supreme over it, in the whole realm of science. Hence he includes mental and moral influences in his study of the causes of disease and in the consideration of the methods of hygiene. Aside from the peculiar point of view given by the fact that this is especially an Australian text-book, attention must be called to the prominence given throughout the book to the public relations of hygiene. The subject of education is discussed from the intellectual and emotional side as well as the physical. The portrayal of child life is not limited to a description of physical degenerations and deformities, but takes in the effect of immoral environment as well. The author indulges in much philosophizing and quotes some interesting passages which appear

to have little to do with the immediate subject. On the topic of public hygiene the author gives some valuable observations on the topographic peculiarities of the different parts of Australia, giving its climate conditions with some detail. The subjects of water-supply, sewage, ventilation, housing, clothing and hygienic habits are discussed with special relation to the national needs and peculiarities.

The volume on therapeutics is less local and presents the remedies and principles of treatment which are familiar to other parts of the civilized world. There is a description of Australian mineral springs, watering places and sanatoriums. No note seems to be made of an indigenous vegetable materia medica. Vaccine therapy receives due consideration. In approaching radiotherapy the author again indulges in some speculation and recalls the fact that "to-day science confidently bases the whole of physics and chemistry on an ethereal substratum." Further on he says: "Hence in the most modern refinements of therapeutics we find ourselves in the ethereal stage, and separated by the narrowest of margins, if separated at all, from the immaterial and the psychical. Thus in x-rays, radiotherapy and ionic medication, we are close to the very essence of things, and to the very origin of life itself." The chapter on this subject is, however, not very long, and the powers attributed to radium are very moderate. The volume is concluded by a chapter entitled "Therapeutic Memorabilia" which contains a large number of hints on the treatment of a variety of diseases.

To one who can find in the expressions of therapeutists a finger pointing to future developments of the healing art, these two volumes with their antipodal flavor and their philosophic trend may indicate a new phase of medical teaching. Their scientific value is somewhat diminished by the rhetorical padding, which, although good in itself, is not exactly scientific. They form interesting reading, but it is unfortunate that their typography in many places does no credit to Australian printing. They are illustrated by a number of very good plates.

THEORIE UND PRAXIS DER BLUTENTZIEHUNG, NACH DEM GEGENWÄRTIGEN STANDE DER WISSENSCHAFT BEARBEITET. Von Prof. Dr. Heinrich Stern, Oberarzt für Innere Medizin am St. Mark's Hospital, New York. Paper. Price, 3.50 marks. Pp. 144, with 15 illustrations. Würzburg: Curt Kabitzsch, 1914.

It is at any rate an interesting if not important indication of the international character of our medical literature that an increasing number of American physicians contribute to German journals and publish more or less extensive works in the German language. The present work by Dr. Stern is an example of this tendency. The subject is as old as medicine, and while the present century presents the lowest ebb of bloodletting in therapeutics, yet enough scientific fact and clinical experience are found to constitute a very good defense of the ancient practice. While it is safe to say that a very large portion of the present generation of physicians have no experience in the use of the lancet, it may very well be that an extension of this method would follow if those who know little or nothing of it would give time to a careful perusal of the evidence in favor of this powerful mode of influencing the blood-pressure and the metabolism. There appears to be a lack of monographs on this subject in English which we may hope to see supplied either by a translation of Stern's work or by the publication of a new one.

TEXT-BOOK OF ANATOMY AND PHYSIOLOGY FOR TRAINING SCHOOLS AND OTHER EDUCATIONAL INSTITUTIONS. By Elizabeth R. Bundy, M.D., Member of the Medical Staff of the Woman's Hospital of Philadelphia. Third Edition. Cloth. Price, $1.75 net. Pp. 408, with 233 illustrations. Philadelphia: P. Blakiston's Son & Co., 1914.

This work ought to be entitled "Applied Anatomy and Physiology," as nearly every chapter ends with a paragraph or two headed "Surgical Notes" or "Clinical Notes," and this of course adds greatly to the value of the book. The illustrations are well selected. There is a table of systemic arteries in the old nomenclature, and tables of the systemic arteries and veins according to the Basle anatomic nomenclature. There is an excellent glossary which, however, does not give the origin of the words.

Medicolegal

Entitled to Recover for Quarantining Infantile Paralysis

(Shidler vs. York County (Neb.), 146 N. W. R. 949)

The Supreme Court of Nebraska holds that a duly licensed physician, acting under the order of the State Board of Health in quarantining and suppressing a highly contagious disease, may recover of the county, where such disease was prevalent, the actual expenses incurred by him and the reasonable value of his services. The court says that in the summer and fall of 1909 there was a large number of cases of what is commonly called "infantile paralysis" in York County. Many of the communities in the stricken territory were thrown into a condition approaching panic, and notably among those communities was the city of York in York County. The then chairman of the county board of health expressed himself as opposed to a quarantine, and failed and refused to call a meeting of the county board of health, or to take any other measures relative to the disease, or to the investigation or control of it, and, on July 20, 1909, the State Board of Health ordered that said disease be quarantined in York County, and by its order instructed the state health inspector to communicate its order to the plaintiff, and to require him to establish and maintain a rigid quarantine of said disease throughout that county. The plaintiff, a duly licensed physician, was at that time a member of the board of health in that county, but he was not the county physician, and was under no contract with, and received no salary from, the county, as a member of its board of health or otherwise. He proceeded to quarantine the disease wherever he could find it in his county, and was occupied with his duties in that behalf from about July 20 to October 1. It appeared that he came into contact personally with about 250 cases of the disease, and devoted his time to those cases to the partial exclusion of his other practice; that, in the performance of those duties, he incurred and paid necessary expenses in the sum of $225; that for his own services in the premises he charged the county supervisors the sum of $267.50. From this latter sum there was deducted four or five items for the quarantine of cases within the proper limits of certain towns and villages. The board of supervisors rejected his claim, but the District Court rendered a judgment in his favor, against the county, for $508.60 and costs taxed at $14.75. That judgment is now affirmed, because, as the Supreme Court views the case, the county was liable to Dr. Shidler for the reasonable value of his services, and the expenses necessarily incurred by him in rendering them.

Physician Not Liable for Hot-Water Bottle Injury in Hospital

(Stewart et al. vs. Manasses (Pa.), 90 Atl. R. 574)

The Supreme Court of Pennsylvania says that this action was against the family physician of a woman, by whose advice she went to a public hospital for a surgical operation. After the operation she was burned by a hot-water bottle that had been left by a hospital nurse in the bed in which she was placed. Recovery of damages was sought on the ground that the injury was caused by the negligence of the defendant, or that of the nurse, for whose action he was answerable. It was alleged that the defendant agreed to perform the operation, and to treat the patient with care and skill while under his charge, and to furnish her the services of a skilful nurse, and that he failed in the performance of his duty in this regard. The evidence showed that the defendant was a member of the associated staff of the hospital and had the privilege of sending patients there for treatment either by himself or by the regular hospital physicians and surgeons; that he agreed for a stipulated sum to perform the operation, but the hospital expenses were to be paid by the patient, to whom he gave a letter of introduction that secured her admission to a private room in the hospital; that she was prepared for the operation by hospital nurses

under the direction of the directress of nurses and etherized by a physician employed by the hospital for that purpose; that she was operated on by the chief hospital surgeon assisted by the defendant, and was removed from the operating-room to the recovery room by hospital nurses and the physician who had etherized her; that the defendant followed them into the recovery room and stood near the foot of the bed when she was placed in it; that the duty of preparing the beds in the recovery room and placing the patients therein rested entirely with the directress and the hospital nurses, the surgeons having nothing to do with it, and that this was the general rule in hospitals. Under these circumstances there was no liability on the part of the defendant for the injury caused by the negligence of a hospital nurse, and a non-suit was properly entered.

Medical Witnesses Need Not Be Licensed Physicians in State

(Rugenstein vs. Ottenheimer (Ore.), 140 Pac. R. 747)

The Supreme Court of Oregon holds that the fact that a medical witness called in this personal injury case was not a physician regularly licensed to practice in that state did not militate against his competency as an expert. The only object of license is to prevent an unqualified person from practicing medicine and surgery; but a man may be ever so learned and well qualified to give an opinion, and yet not be engaged in practice. It is the duty and within the province of the court as a preliminary question of fact to determine whether or not the witness is qualified as an expert, to the end that he may give an opinion in evidence, and the appellate courts will not disturb the decision of the trial court, unless there is no evidence to sustain the preliminary decision of that court. The fact that the witness in question had been licensed to practice medicine in California, and had been so engaged since, was competent evidence for the consideration of the court in determining his fitness as an expert witness.

Society Proceedings

COMING MEETINGS

Amer. Academy of Ophthal. and Oto-Laryn., Boston, Oct. 19-21.
American Association of Railway Surgeons, Chicago, Oct. 14-16.
Association of Military Surgeons of the U. S., Cincinnati, Sept. 29-Oct. 2.
Delaware State Medical Society, Wilmington, Oct. 13-14.
Idaho State Medical Association, Boise, Oct. 8-9.
Minnesota State Medical Association, St. Paul, Sept. 30, Oct. 1-2.
Mississippi Valley Med. Assn., Cincinnati, Oct. 27-29.
Nevada State Medical Association, Reno, Oct. 13-15.
New Mexico Medical Society, Albuquerque, Oct. 5-7.
Utah State Medical Association, Salt Lake City, Sept. 29-30.
Vermont State Medical Society, Rutland, Oct. 8-9.
Virginia Medical Society, Washington, D. C., Oct. 27-30.
Wisconsin State Medical Society, Oshkosh, Oct. 7-9.

COLORADO STATE MEDICAL SOCIETY

Forty-Fourth Annual Meeting, held at Boulder, Sept. 9-11, 1914

The President, Dr. O. M. GILBERT, Boulder, in the Chair

Rôle of Chronic Intestinal Indigestion in Children in Production of Epilepsy

DR. J. W. AMESSE, Denver: Intestinal putrefaction, associated with chronic constipation and chronic intestinal indigestion, forms one of the most important etiologic factors in arousing epileptic paroxysms. In general, disorders of digestion have been shown to be more concerned with the nervous instability of children than is commonly supposed. The management of these cases involves the most rigid survey of domestic and personal hygiene. Whether the toxemia is or is not associated with major disturbances of the nervous system, isolation of the child, preferably in a hospital, is most desirable. Where, as will obtain in the great majority of cases, this separation from the home is not feasible, the absolute cooperation of mother and nurse is indispensable. The hygienic management will not only embrace a proper dietary, but full instructions in writing must be furnished regarding hours of sleep, the character and amount of exercise, periods of rest, baths, fresh air and suitable clothing. In my experience these children are usually heavy milk drinkers, the balance of their ration consisting of starch in the form of potato, bread, rice, etc. The distention of the abdomen from the flatulence invariably set up by this diet is apparent on first examination. The most effective method is to change the food from a carbohydrate to protein ration, depending on albumin-milk, fermented milk, or buttermilk for a beverage only.

DISCUSSION

DR. HERBERT B. WHITNEY, Denver: The healthy stomach has a great deal of reserve power and will digest almost anything. There are cases, however, of disease of the stomach largely inherited, a nervous condition which predisposes to epilepsy. Where there is chronic indigestion at about the age of 6, 8 or 10 years, we have a difficult problem so far as treatment is concerned, and these cases demand a more accurate knowledge of dietetic principles in the treatment of dyspepsia in infancy itself. I am accustomed to put these children on an exclusively milk diet and gradually go on to the so-called antifermentive diet which comprises chiefly meats, eggs, vegetables, spinach, with exclusion of all sugars and starches, and also some forms of toast and bread, with soups, especially bouillon and consomme, etc.

DR. J. A. BLACK, Pueblo: I have in mind two children who were nearly of the same age. They were born of parents of the same character and moved in the same class of society. One child was a boy, the other a girl. One child was breast-fed and developed into a beautiful baby. The other child when born was a puny struggling little thing. The mother of the child that was bottle-fed followed instructions. After two or three months the child began to grow rapidly. The child is now 5 years of age and has never had a day's sickness. The other child that was breast-fed was allowed to eat indiscriminately all kinds of candies and cakes and the result was in a few months it developed gastro-intestinal trouble. After a few months or years the child had an attack of rheumatism and at the present time it is bordering on chorea.

DR. FRANK P. GENGENBACH, Denver: A girl at the age of puberty had some convulsive attacks. She was very frail, thin, had grown rapidly, was of marked nervous temperament and was a big eater. She would fall over and have a certain amount of twitching, but her face would be pallid rather than congested. She had several of these attacks a few weeks apart. Dr. Pershing decided that the child had beginning epilepsy, and recommended that she be put on bromids. As her blood-pressure was rather low she was given digitalis, and as she was anemic she was given iron, nux vomica, general stomachics, and he suggested a curtailment of the diet, and that the processes of elimination be looked after. As a result of this line of treatment the child did not have another attack for over a year, and then an attack was brought on by overeating. It was the last attack the girl had.

DR. H. G. WETHERILL, Denver: From 1882 to 1884 I was intern in the New Jersey State Asylum in Trenton, and in investigating the peripheral irritations which gave rise to epilepsy I found we had in that institution thirty-three male epileptics of varying ages, many of them boys. I made a careful study of the relationship of the epilepsy in these thirty-three males to phimosis. I found many of them needed circumcision. We started a campaign of this operation for the younger ones particularly, and the effect on the epilepsy for the first few months was marked. There can be no possible question that peripheral irritations, such as accompany phimosis and intestinal troubles from indigestion and improper feeding, have a very definite causative effect in producing these conditions.

Nasal Treatment of Dysmenorrhea

DR. L. B. LOCKARD, Denver: It has long been established that a definite physiologic and pathologic relationship exists

between the nose and throat and the sexual organs, particularly in the female, but the clinical significance of this relationship has not been grasped by the profession at large.

We have no way of foretelling in an individual case whether it is one of nasal dysmenorrhea or whether the pain is due to pelvic lesions. Complete failures have resulted in cases in which no pelvic disease has been demonstrable, and, on the other hand, some of the most brilliant results have occurred in individuals in whom various uterine and ovarian abnormalities existed. As a general rule it may be said that patients without organic disease of the sexual organs offer the most promising prognosis.

DISCUSSION

DR. T. E. CARMODY, Denver: Many nervous conditions affect the nose as well as the sexual organs. Headaches due to menstrual disorders are frequently relieved by packing the nose with cocain.

DR. H. A. SMITH, Delta: A girl came to me five years ago with obstruction on one side of the nose. I removed a spur of bone about half an inch in diameter from the anterior end of the middle turbinate. Nothing was said about any gynecologic condition. A year later her mother told me that she had not had any pain since her nose was operated on, whereas prior to that time she suffered a good deal of pain. The psychic effect must be left out of that case.

DR. ROBERT LEVY, Denver: In spite of a great many attempts to prove scientifically that there is a distinct relation between the nose and the genital organs, I think we must in the ultimate analysis conclude that many of these remarkable effects, if not all of them, are psychic.

Typical and Atypical Cases of Addison's Disease

DR. GEORGE H. CATTERMOLE, Boulder: My first case was that of a minister, 29 years old, who came to Colorado on account of pulmonary tuberculosis. He received tuberculin treatment for about six months and was much improved, so that he engaged in outdoor occupations. Finally, in the spring of 1909, he took up the work of a house-painter, which kept him outside and constantly exposed to the sun, so that the first bronzing was thought to be tan. A little later, however, the bronzing became more intense and was noticed over the portions of the body protected by the clothing. This was a typical case of Addison's disease, showing the bronzing, asthenia and digestive symptoms. With the bronzing there was a loss of strength and then failure of appetite and diarrhea. At necropsy the left lung showed a healed cavity at the apex. There was no active trouble apparent in the lungs. The suprarenals showed enlargement and were both calcareous and caseous.

The second case was that of a married woman, 27 years old, who was sent to Boulder in August, 1913, because she was not getting along well at home. She had been coughing for four or five years and had a bad tuberculous family history. Examination of the chest showed only limited involvement in the apices. There was pain in the right lumbar region which had existed for several months. The peculiarity in this case was the slight amount of discoloration in the skin. There was an anemic pallor with an uncertain fawn color, but not a typical bronzing. At her home she had been kept in the sunshine and this could account for some tanning. We could not account for so much prostration, for such feeble circulation, and so much digestive disturbance resulting from the pulmonary trouble. In those cases of tuberculosis in which the prostration is greater than can be accounted for by the trouble in the lung, we should remember the possibility of the chromaffin system being diseased and possibly try the use of the suprarenal gland or its products as a therapeutic test and a remedial agent.

(To be continued)

The Last Word in Diagnosis.—There is no sign or symptom that may not be fallacious. The most experienced judgment is fallible.—Arthur E. Giles, *Clinical Journal.*

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

American Journal of Diseases of Children, Chicago

September, VIII, No. 3, pp. 185-256

1 *Diagnosis and Prognosis of Congenital Heart Disease. C. H. Dunn, Boston.
2 *Experiences with Whey Modified Milk in Infant Feeding. J. S. Leopold, New York.
3 *Relation of Bovine Tuberculosis to Early Tuberculosis in Children. T. C. McCleave, Berkeley, Cal.
4 *Influence of Lactose on Metabolism of Infant. F. B. Talbot and L. W. Hill, Boston.
5 Examination of Chest in Children. R. M. Smith, Boston, and C. D. Sweet, Fresno, Cal.
6 *Absorption of Fat from Intestinal Tract of Actively Tuberculous Child. F. W. Schlutz, Minneapolis.

1. **Congenital Heart Disease.**—The following rules for differential diagnosis are given by Dunn. A case showing cyanosis with enlargement of the cardiac dulness or palpable thrill, or both, is one of pulmonary stenosis. If the baby dies shortly after birth, the most probable lesion is pulmonary stenosis alone. If the baby survives early infancy, or lives on into childhood, the pulmonary stenosis is probably associated with some other lesions. If the murmur is notably transmitted into the vessels of the neck, or if a "humming top" murmur is present, the additional lesion is probably open ductus arteriosus. If the murmur has neither of these characteristics, the complicating lesion is probably defective interventricular septum.

A case showing a murmur and enlargement, without cyanosis, is probably defective interventricular septum. If the murmur is not transmitted into the vessels of the neck, this lesion exists alone. If the murmur is so transmitted, or if the "humming-top" murmur is present, the lesion is probably combined with open ductus arteriosus. A case showing a murmur, without either cyanosis or enlargement, especially if the murmur is markedly transmitted into the vessels of the neck, or if it extends into diastole, is probably one of open ductus arteriosus alone. If the murmur is of the "humming-top" variety, extending throughout the cardiac cycle, the diagnosis of this lesion is almost certain.

The prognosis of the various congenital cardiac lesions and their combinations, Dunn says, does not vary with the character of the lesions except in two forms, namely, pulmonary stenosis alone, and open ductus arteriosus alone. In all the other forms and combinations there is evidence that any patient may survive, and even live to adult life. On the other hand, the evidence shows that development and nutrition suffer to a varying degree, and that the children are in general less resistant, many of them dying young of various additional affections, such as the gastro-intestinal or infectious diseases. The prognosis in babies cyanotic at birth is grave, as many of them have pulmonary stenosis alone, and die within a very short time. In those who survive, the pulmonary stenosis is probably combined with some compensating lesion, and is that of congenital cardiac disease in general. In cases which show the clinical picture of open ductus arteriosus alone, the prognosis is very good. The patients do not usually show any interference with development or nutrition, but develop normally, with eventual disappearance of the signs of cardiac disease.

2. **Whey Modified Milk.**—Of 54 infants who received whey modified milk very good results were obtained in 36 cases, fairly good results in 10 cases and poor results in 8 cases. Two cases in infants over 6 months of age, 2 cases of atrophy, 1 case of exudative diathesis, 1 case of influenza, 1 case of enteritis and 1 case of nervous vomiting did not do well on whey modified milk. Based on the results obtained by Leopold while using Schloss' whey modified milk during a period of two years he offers the following conclusions: Whey modified milk is indicated whenever breast milk is not obtainable. Much better results are obtained with this milk mixture than with any other method of artificial feeding, in institutions at any rate. Whey modified milk is especially

indicated in very young infants, and in infants under 3 months of age.

3. **Bovine Tuberculosis.**—McCleave maintains that it is unquestionably the duty of physicians to instruct their patients and the public that bovine tuberculosis is, without giving it undue weight and always keeping it in proper subordination to the larger problem of infection from human sources, a grave menace to human health, but that it is, by the simple expedient of home pasteurization, a disease most easily prevented in man.

4. **Influence of Lactose on Metabolism of an Infant.**—Talbot and Hill claim that increasing amounts of sugar up to a certain limit increase the retention of nitrogen, and beyond that point may diminish the absorption and possibly the retention of nitrogen. Increasing amounts of sugar do not affect the absorption of fat up to a certain point, beyond which point there may be a diminished absorption of fat. Sugar given beyond certain limits may result in a greatly increased acidity of the stool and diarrhea. The diarrhea is probably a result of the increased peristalsis. Clinical evidence of a carbohydrate fermentation is the scalded, irritated skin of the buttocks and the green, watery acid stools. The retention of ash seems to depend on the amount of sugar in the food. When the amount of sugar is increased beyond a certain point, there may be a negative balance and the ash may be lost from the body. It is impossible to say whether this negative balance is due to the diarrhea, or the increased acidity of the stool, or other factors in which fat plays a part. Clinically, the amount of sugar which an infant can digest and absorb varies with the individual. There is no fixed point in a given individual at which sugar will or will not be digested at a given time. Other factors than the amount of sugar may influence its digestion.

6. **Fat in Tuberculosis.**—The series of cases reported by Schlutz comprises all the common forms of tuberculosis and includes four cases with pulmonary involvement alone, four with pulmonary glandular involvement, three with pronounced glandular involvement only, three cases of bone tuberculosis, in one of which there was also marked glandular involvement and one in which there was pulmonary and suspected peritoneal involvement. The fat absorption is distinctly diminished only in the glandular type of tuberculosis. The stools in three of the cases showed both macroscopic and microscopic evidence of fat, considerably in excess of the normal. The same was shown by the quantitative determinations. In all the other forms of tuberculosis the fat absorption very nearly approached the normal. The one case suspected as peritoneal showed good fat absorption. This study brought out the interesting fact that the fat absorption was if anything improved by the addition of certain amounts of carbohydrate to the diet.

The results of this series of cases seem to show in Schlutz's opinion that fat absorption in most of the common forms of tuberculosis is practically normal and is likely to be diminished only in those cases in which there is extensive glandular and lymphatic involvement. If it were a question of fat absorption only, high fat feeding would not be contra-indicated in most forms of tuberculosis. To what extent scrofulous or exudative manifestations, apparently unfavorably influenced by fat-rich food, should influence the diet of the tuberculous child, Schlutz says, is a question which the individual case must determine. The presence of the exudative condition apparently does not influence fat absorption. Experimental and clinical evidence both seem to show that a diet which insures the largest amount of fat deposit in the tissue, with the least retention of water, is the one most beneficial to the tuberculous child.

Boston Medical and Surgical Journal

September 3, CLXXI, No. 10, pp. 365-400

7 Dissociated Personality. E. G. Grey and W. R. Sisson, Boston.
8 Pyogenic Infections of Upper Urinary Tract. A. L. Chute, Boston.
9 Treatment of Movable Kidney with or without Infection, by Posture. H. Cabot and L. T. Brown, Boston.
10 Roentgen Determination of Certain Renal and Ureteric Variations and Disorders. P. Brown, Boston.
11 Early Diagnosis and Treatment of Manic Depression. A. H. Ring, Arlington Heights.
12 Scheme for Promoting Efficiency in State Sanatoria. W. C. Bailey, Boston, and C. C. MacCorison, Reading.

September 10, No. 11, pp. 401-436

13 Syphilis in Massachusetts. A. Post, Boston.
14 Syphilis of Eye in Hereditary Syphilis. G. S. Derby, Boston.
15 Vascular and Cardiac Syphilis. G. G. Sears, Boston.
16 Syphilis of Tonsil. C. M. Smith, Boston.
17 Syphilis of Lung. E. A. Burnham, Boston.
18 Relation of Syphilis to Internal Medicine. D. L. Edsall, Boston.
19 What the City Should Do to Control Syphilis. T. B. Shea, Boston.

Iowa State Medical Society Journal, Washington

August, IV, No. 2, pp. 109-185

20 Conservation of Hearing. T. U. McManus, Waterloo.
21 Intracranial Pathology and Fundus Changes. G. F. Harkness, Davenport.
22 Unfavorable Results Following Gastro-Enterostomy. C. DeJong, Fort Dodge.
23 Specific Treatment for Lupus and Other Parasitic Lesions of Skin. J. W. Kime, Fort Dodge.
24 Treatment of Puerperal Sepsis. H. M. Stowe, Chicago.
25 Practice of Principles of Medical Ethics. J. H. Schrup, Dubuque.
26 Traumatism of Hip in Children and Adolescents. A. Steindler, Des Moines.
27 Are Thorough Examinations Worth While? J. F. Studebaker, Fort Dodge.
28 Study of Parathyroids. C. H. Churchill, Fort Dodge.
29 Infant Feeding. G. A. Biebesheimer, Reinbeck.
30 Indications for Paracentesis of Tympanum. R. E. Robinson, Waverly.

Journal of Cutaneous Diseases, New York

September, XXXII, No. 9, pp. 607-682

31 *Spinal Fluid with Reference to Involvement of Nervous System in Secondary Syphilis. U. J. Wile and J. H. Stokes, Ann Arbor, Mich.
32 *Abderhalden Technic as Applied to Diagnosis of Syphilis. H. R. Varney and P. F. Morse, Detroit.
33 White Spot Disease. G. M. MacKee and F. Wise, New York.

31 and 32. Abstracted in THE JOURNAL, June 13, p. 1920.

Journal of Experimental Medicine, Lancaster, Pa.

September, XX, No. 3, pp. 201-319

34 *Parameningococcus and Its Antiserum. M. Wollstein, New York.
35 *Metabolism of Calcium, Magnesium, Sulphur, Phosphorus and Nitrogen in Acromegaly. O. Bergeim, F. T. Stewart and P. B. Hawk, Philadelphia.
36 *Calcium Metabolism after Thyroparathyroidectomy. O. Bergeim, F. T. Stewart and P. B. Hawk, Philadelphia.
37 *Method for Estimating Bacteria in Circulating Blood in Rabbits. C. G. Bull, New York.
38 *Localization of Virus and Pathogenesis of Epidemic Poliomyelitis. S. Flexner and H. L. Amoss, New York.
39 *Experimental Tuberculosis of Cornea. P. A. Lewis and C. M. Montgomery, Philadelphia.
40 *Excretion of Nitrogen in Fever. N. C. Sharpe and K. M. B. Simon, Toronto, Ont.
41 *Liver Function as Influenced by Ductless Glands. G. H. Whipple and F. W. Christman, Baltimore.

34. **Parameningococcus and Its Antiserum.**—The parameningococci of Dopter, Wollstein states, are culturally indistinguishable from true or normal meningococci, but serologically they exhibit differences as regards agglutination, opsonization and complement deviation. Because of the variations and irregularities of serum reactions existing among otherwise normal strains of meningococci it does not seem either possible or desirable to separate the parameningococci into a strictly definite class. It appears desirable to consider them as constituting a special strain among meningococci, not, however, wholly consistent in itself. The distinctions in serum reactions between normal and parameningococci are supported by the differences in protective effects of the monovalent immune sera on infection in guineapigs and monkeys. It is therefore concluded by Wollstein that it is highly desirable to employ strains of parameningococcus in the preparation of the usual polyvalent antimeningococci serum. It remains to be determined whether it is better to employ the parameningococci along with normal meningococci in immunizing horses, or to employ normal and para strains separately in the immunization process and to combine afterward, in certain proportions, the sera from the two kinds of immunized horses.

35. **Metabolism in Acromegaly.**—A distinct retention of calcium, magnesium and phosphorus was noted by the author

which was not accompanied by corresponding changes in general metabolism as evidenced by a practical balance of nitrogen and sulphur. It is concluded that there is a primary disturbance in the metabolism of the mineral elements mentioned, with the probable formation of new bony tissue. The distribution of elements between urine and feces shows no abnormal variations.

36. **Calcium Metabolism after Thyroparathyroidectomy.**—The metabolism of calcium was studied by the authors in a man after complete removal of the thyroid and parathyroid glands. A slight retention of calcium (0.4578 of a gm. of calcium oxid in the ten-day period) was noted. The urinary calcium excretion was low, averaging 0.0134 of a gm. per day on a daily ingestion averaging 1.6736 gm. of calcium oxid. A slight increase was observed during the period of study in the calcium content of the blood. No symptoms of tetany were noted in the patient, who survived operation thirty-nine days. The low urinary and blood-calcium values are taken to show deficient absorption of calcium, which may bear some relation to the decreased gastric secretion after parathyroidectomy. Attempts are made to explain the non-occurrence of tetany as due to the high calcium intake and to the development of a compensatory mechanism in which the pituitary body may play a part.

37. **Bacteria in Circulating Blood.**—When rabbits are injected intravenously with a quantity of virulent streptococci or pneumococci sufficient to cause death within two to four days the septicemia takes a definite course with slight variations. The bacteria rapidly decrease in number from the time of the injection to from two to four hours, at which time the blood is sterile or contains only a few bacteria. Within five to six hours the bacteria reappear in the blood and steadily increase until the death of the animal. If the bacteria are less virulent, the same quantity of culture causes a chronic type of infection. The same initial decrease in the number of bacteria occurs. The reentrance into the blood is somewhat delayed, the septicemia does not reach the height obtained in the acute cases, and a second fall occurs within the course of a few hours. These rabbits show a low blood-invasion or a sterile blood-culture for several days. During this time they become emaciated to a marked degree. Then the low septicemia rapidly rises or the rabbit with a sterile culture develops a severe septicemia within a few hours and death takes place from a few hours to two days thereafter. In this type of infection local lesions, pericarditis, pleurisy, peritonitis, etc., are usually found. In the infections which run an acute course no gross lesions are found.

If the bacteria are still less virulent they never reenter the blood after the initial disappearance and the rabbits remain in good condition. Variations in the natural resistance of individual animals may be sufficient to cause quite marked irregularities in the course of the infection. Pneumococci can be standardized so as to produce a particular type of infection more easily than streptococci. In general infections such as those produced by streptococci and pneumococci the number of the bacteria present in the circulating blood at a given time supplies accurate and delicate information regarding the severity of the disease.

A large number of bacteria found in the blood and tissues at autopsy do not necessarily prove the existence of a heavy infection before the onset of the death agony, since it is a well-known fact that bacteria multiply with enormous rapidity, once the natural resistance of the animal has been overcome. Again, the individual animals of the same species, age and apparently of identical physical condition react to the aggressive force of the infecting organisms variously. This fact is readily found out by the injection of a series of rabbits with lethal quantities of bacteria per body-weight, and by making tests at various periods before death results, which, in the case of streptococci, ranges from one to six days.

38. **Localization of Virus of Epidemic Poliomyelitis.**—Flexner and Amoss hold that the virus of poliomyelitis is capable of penetrating the retina without producing apparent injury, to reach the central nervous organs. The virus injected into the blood is deposited promptly in the spleen and bone-marrow, but not in the kidneys, spinal cord or brain. Nothwithstanding the affinity which the nervous tissues possess for the virus, it is not removed from the blood by the spinal cord and brain until the chorioid plexus and blood-vessels have suffered injury. The intervertebral ganglia remove the virus from the blood earlier than do the spinal cord and brain.

An aseptic inflammation produced by an intraspinous injection of horse-serum facilitates and insures the passage of the virus to the central nervous organs, and the production of paralysis. The unaided virus, even when present in large amounts, passes inconstantly from the blood to the substance of the spinal cord and brain. When the virus within the blood fails to gain access to the central nervous organs, and to set up paralysis it is destroyed by the body, in course of which destruction it undergoes, as a result of the action of the spleen and, perhaps, other organs, diminution of virulence.

The histologic lesions that follow the intravenous injections of the virus in some, but not in all, cases differ from those which result from intraneural modes of infection. In escaping from the blood into the spinal cord and brain, the virus causes a lymphatic invasion of the chorioid plexus and widespread perivascular infiltration, and from the latter cellular invasions enter the nervous tissues. A similar lymphoid infiltration of the chorioid plexus may arise also from an intracerebral injection of the virus.

The histologic lesions present in the central nervous organs in human cases of poliomyelitis correspond to those that arise from the intraneural method of infection in the monkey. The virus in transit from the blood through the cerebrospinal fluid to the substance of the spinal cord and brain is capable of being neutralized by intraspinous injection of immune serum, whereby the production of paralysis is averted. The experiments described support the view that infection in epidemic poliomyelitis in man is local and neural, and by way of the lymphatics, and not general and by way of the blood. Hence Flexner and Amoss uphold the belief that the infection atrium is the upper respiratory mucous membrane.

39. **Experimental Tuberculosis of Cornea.**—As a result of their studies Lewis and Montgomery believe that tuberculosis is primarily an exudative inflammation and secondarily proliferative in its character. More than that, they are led to the belief that the cellular exudate, protective though it may be in purpose, is defective and is destructive in its actual influence. Even the phagocytic activity of the cells of such an exudate may probably serve to distribute living bacilli and thus spread the disease to fresh areas.

40. **Excretion of Nitrogen in Fever.**—The rise of temperature following typhoid vaccination is accompanied by a marked increase in the output of total nitrogen, creatinin, and especially of uric acid. The reaction to tuberculin is slower, but is also accompanied by an increased output of nitrogenous substances, that is, however, less uniform and generally less pronounced. In a case of malaria studied by the authors there was a tendency for the rise of temperature to be accompanied by an increased output of total nitrogen and less uniformly of creatinin; on two days on which the fever was preceded by rigor the output of uric acid was increased.

41. **Liver Function as Influenced by Ductless Glands.**—Whipple and Christman found that adrenal insufficiency produced by extirpation of three-fourths or more of the gland tissue will be associated with a drop in liver phthalein excretion. With hypertrophy of the adrenal fragment the excretion comes back to normal, but may fall again when more adrenal tissue is removed. Pancreatic insufficiency causes a progressive fall in the phthalein excretion, indicating a grave lowering of the functional capacity of the liver. This fact has a direct bearing on the question of diabetes. Parathyroid insufficiency with tetany causes no decrease in phthalein output, but at times a rise above normal. This comes out best when the phthalein curve is low following pancreas extirpation. Parathyroid tetany may cause hyperactivity on the part of the liver cells. Thyroid insufficiency produces no change

in the uniform curve of phthalein excretion. Hypophysis insufficiency shows an initial fall in the curve, followed by a return to normal and a final drop in the last few days before death.

These experiments supply evidence to the effect that the liver is very much concerned in the derangement that follows the removal of the ductless glands. Hence it seems probable that this disturbance of the liver function may be an important factor in the general symptom-complex of ductless gland insufficiency.

Journal-Lancet, Minneapolis

September 1, XXXIV, No. 17, pp. 451-474

42 Surgical Clinics of Russia, Finland, Sweden, Norway, Denmark and Belgium. (To be Continued.) W. J. Mayo, Rochester.
43 Suggestions on Obstetric Technic. A. M. Brandt, Bismarck, N. D.
44 Chronic Gastric Disturbances: Differential Diagnosis. G. B. Eusterman, Rochester.
45 Trials and Rewards of Physician. H. M. Johnson, Dawson.

Kentucky Medical Journal, Bowling Green

September 1, XII, No. 17, pp. 509-528

46 Diagnosis and Surgical Lesions of Urinary Tract. I. Abell, Louisville.
47 Vaccine Therapy and Widal Reaction in Typhoid. B. W. Wright, Bowling Green.
48 Intestinal Parasites with Reference to Uncinariasis. J. W. Stephenson, Pikeville.
49 Urethritis. L. T. Eckler, Falmouth.
50 Gun-Shot Wound of Abdomen. Report of Case. A. W. Cain, Somerset.

Lancet-Clinic, Cincinnati

August 29, CXII, No. 9, pp. 225-252

51 Symptoms and Physical Signs of Approaching Organic Disease. C. L. Mix, Chicago.
52 Trismus. H. H. Hoppe, Cincinnati.
53 Graduates of Medical Department of University of Pennsylvania who Have Taught or Practiced in Cincinnati. (To be continued.) A. G. Drury, Cincinnati.

Medical Record, New York

August 22, LXXXVI, No. 8, pp. 321-362

54 Low Table Position and Other Aids to Performing Suprapubic Prostatectomy. C. L. Gibson, New York.
55 *Coccygodynia. Treatment by Injections of Alcohol. F. C. Yeomans, New York.
56 Four Cases of What Appeared to be Tuberculous Meningitis with Apparent Permanent Arrestment. C. C. Browning, Los Angeles.
57 Syphilis of the Lungs Simulating Pulmonary Tuberculosis. J. Blinder, New York.
58 Prevention of Schoolroom Disease and Dust. C. W. Crampton, New York.
59 Malarial Fever. L. Sexton, New Orleans.
60 State Prevention and Pulmonary Tuberculosis. T. J. Mays, Philadelphia.
61 Necessity for Parental Cooperation in Examination of Mental Defectives. J. T. Krause, Brooklyn.

September 5, No. 10, pp. 405-446

62 Immediate Results of Salvarsan Treatment of Syphilis, as Judged by Wassermann Reaction, Using Cholesterin Fortified Antigen. E. G. Stillman, New York.
63 Auto-Immunization in Respiratory Infections. C. H. Duncan, New York.
64 Origin of Auscultation and Percussion and the State of Clinical Medicine in Time of Auenbrugger and Laënnec. R. C. Newton, Montclair, N. J.
65 Public Health Education. H. Greeley, Brooklyn.
66 Useful Surgeon. H. W. Wightman, Omaha, Neb.
67 Herpes Zoster and Malaria. W. H. Deaderick, Hot Springs, Ark.
68 Cerebral Syphilis in Secondary Stage. C. B. Craig, New York.
69 Detection of Gelatin in Ice-Cream. D. I. Macht, Baltimore.

September 12, No. 11, pp. 447-488

70 *Physiology of Gastric Motility. W. J. Mallory, Washington, D. C.
71 Present Stage in Treatment of Syphilis. C. M. Williams, New York.
72 Case of Tuberculosis of Sclera of Probable Primary Origin. G. H. Bell, New York.
73 Neglect of Aged. I. L. Nascher, New York.
74 Medical Bugbear: Dispensary Abuse. M. M. Davis, Jr., Boston.
75 Syphilophobia. D. W. Montgomery, San Francisco.

55. **Coccygodynia Treatment by Injections of Alcohol.**—The treatment proposed by Yeomans is an application of the principle of injection of sensory nerves with 70 to 80 per cent. alcohol, thereby causing their degeneration as suggested by Schlösser in 1907. All of Yeomans' seven cases were of the type of neuralgia or neuritis of the coccygeal nerves in which this method is peculiarly applicable, though he thinks it should be tried in all cases of coccygodynia, whatever their nature, as its application is simple and harmless. It may relieve the distressing pain even though it does not affect its cause. The patient, with rectum empty, assumes the left lateral (Sims') position on a firm table, with the thighs well flexed on the abdomen, and the region of the coccyx is painted with tincture of iodin. An all-glass Luer or similar sterile syringe of 2 centimeters capacity is filled with 80 per cent. alcohol and armed with a 2-inch needle of fine gauge. The right index finger is now inserted into the rectum and the point of maximum tenderness is determined by counter pressure with thumb outside. Maintaining the finger in the rectum to guard against its puncture and to act as a guide, the needle is now introduced through the midline directly to the painful spot. When this is reached the patient exclaims from pain that is exquisite but tolerable, and the injection of 10 to 20 minims is made slowly. The needle is withdrawn and its puncture sealed with collodion after neutralizing the iodin on the skin with alcohol. The pain from the injected alcohol lasts a few minutes only and may be followed by a dull ache for a day or two. As a rule, three and at the most five injections should suffice. The interval between the injections should vary from five to ten days—one week on the average—and they are to be made always at the joint which is found most tender at the time of injection.

70. **Physiology of Gastric Motility.**—By means of the local autonomous neuromuscular mechanism, Mallory states, the stomach is capable of performing its motor functions in an essentially normal manner, even when separated from the central and sympathetic nervous systems by section of both vagi and both splanchnic nerves. Normally, however, the gastric motor functions are modified by many extrinsic influences. Motor impulses, and those for increasing tonus and accelerating peristalsis, pass through the vagus nerves. These impulses are increased by mental excitement and impaired by physical exhaustion. Inhibitory influences, those for reducing tonus and retarding peristalsis, pass principally through the splanchnic nerves. These impulses are increased by mental depression and impaired by the internal secretions of the adrenals. The functions of the pyloric sphincter are under the control of conditions in the stomach, and are modified by nervous reflexes from the duodenum and small intestine.

The following agents have a sufficiently definite effect on gastric motility to be of therapeutic value; heat and cold applied to the abdomen externally; massage of the abdomen; atropin, physostigmin, pilocarpin, either by mouth or by hypodermic injection; hypophysis extract and suprarenal extract intravenously. Surgical operations performed on the stomach for the purpose of facilitating the discharge of gastric contents are sometimes only a partial success, or even an entire failure, when planned and executed in conformity with anatomic relations rather than physiologic considerations. The size, shape, position, tonus and capacity of the stomach vary under physiologic conditions. Therefore, in a gastro-intestinal anastomosis, the operation should be so performed and the stoma so situated that the discharge of gastric contents would not be hindered, but facilitated by the physiologic motility of the stomach. Gastric and intestinal peristaltic waves should run in the same direction. The stoma should be situated in the pyloric antrum, in which the expulsion of gastric contents will depend on peristalsis instead of gravity and in which it will be lowest when the stomach is nearly empty.

Modern Hospital, St. Louis

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76 Meat Hygiene in United States—Its Value and Scope. W. H. Lipman, Chicago.
77 Hospital Organization and Accounting System. H. M. Wechsler, New York.
78 Relation of Work to Social Service. M. I. Husted, Clifton Springs, N. Y.
79 Artificial Illumination in Hospitals. M. J. Sturm, Chicago.
80 Presentation of Theoretical Work to Student Nurses. M. C. Wheeler, Chicago.
81 Items in Hospital Efficiency—Nursing of Patients. J. A. Hornsby, Chicago.

82 Feeding the Hospital—Introduction. L. Graves, Chicago.
83 Evanston General Hospital's Contagious Pavilion. M. J. Sturm, Chicago.
84 Planning for Health—Pressing Problem. F. Brush, New York.

New Orleans Medical and Surgical Journal

September, LXVII, No. 3, pp. 211-310

85 Arkansas Child Welfare Association. W. H. Deaderick, Hot Springs, Ark.
86 Blood-Pressure—Reference to "Energy Index" and "Cardiac Load." G. W. Norris and J. R. Davies, Philadelphia.
87 How To Fit Glasses. T. J. Dimitry, New Orleans.
88 Prophylaxis of Typhoid. G. E. Henson, Jacksonville, Fla.
89 Two Attacks of Herpes Zoster in Same Individual. D. W. Montgomery, San Francisco.
90 Severe Case of Vincent's Angina. E. M. Dupaquier, New Orleans.

New York Medical Journal

September 5, C, No. 10, pp. 449-496

91 *Phenol Instillation in Treatment of Bladder Tuberculosis. E. L. Keyes, Jr., New York.
92 Compulsion Neurosis. Report of Case. A. Stern, New York.
93 *Abdominal Incisions and Intra-Abdominal Pressure. M. J. Horan, New York.
94 Diagnostic Aids in Diseases of Bones and Joints. L. Keller, New York.
95 *New Instrument for Intravenous Injection. J. Frankel, New York.
96 Autolactotherapy. C. H. Duncan, New York.
97 Tonsil from Surgical Point of View. M. Lubman, New York.
98 Congenital Absence of Uterus and Adnexa. B. K. Chowdry, Calcutta, India.
99 Second Infection with Spirocheta Pallida. B. C. Corbus, Chicago.

September 12, No. 11, pp. 497-548

100 Tuberculization and Immunization. (To be Concluded.) M. Fishberg, New York.
101 Paraffin Treatment of Constipation. J. H. Kellogg, Battle Creek, Mich.
102 Newer Teachings Concerning Diseases of Gastro-Intestinal Tract. M. I. Knapp, New York.
103 Indications of Gastric Ulcer and Its Surgical Treatment. C. G. Cumston, Geneva, Switzerland.
104 Appendicostomy in Case of Chronic Ulcerative Coloproctitis. J. F. Saphir, New York.
105 Study of Renal Functional Activity by Means of Phenolsulphonephthalein. J. P. Jones, Philadelphia.
106 Case of Sciatica Entirely Cured in Three Weeks' Treatment. H. Marcus, New York.
107 Systematized Education of Public Health Matters. H. Greeley, New York.
108 Contributions which Women Have Made to Medical Literature. M. M. Loomis, Chicago.

91. **Tuberculosis of Bladder.**—Keyes has modified Rovsing's treatment to the extent of employing phenol in instillation instead of irrigation, and in solutions of a strength varying in accordance with the sensitiveness of the patient. He begins with a solution of one to 200 of water and rapidly increases this to 1 per cent. before the patient complains of an increase in pain. The half dozen patients on whom he has been able to employ this technic have shown no great benefit until the solution reached a strength of from 2 to 5 per cent. In two instances he has even employed a supersaturated solution, drawing into the instillator a few minims of pure phenol, and then a few minims of water, thus making an emulsion, of which one or two minims may be instilled into the posterior urethra. The reaction from such an instillation is likely to be very marked. Its use is justified only where all else fails. It is not necessarily any more efficacious than the solutions.

93. **Abdominal Incisions and Intra-Abdominal Pressure.**—In four cases the esophagus was ligated by Horan through an incision in the neck, after placing a glass tube in the stomach, making the tube as secure and air-tight as possible with a ligature. An incision was made parallel to the umbilicus through the right rectus, and the rectum was ligated. The incision was closed in the ordinary manner, pressure being applied in all four cases to the full amount of the automobile gauge, viz., 120 pounds, and after the amount registered in one case, the pumping was continued until the abdomen looked to be twice the normal size. No hernia protruded in either case.

In two cases in which the incision was made in the right rectus, with the rectum ligated and the incision sutured, another incision was made in the median line from the sternum to the umbilicus, the tube was ligated within the stomach, and the incision was closed. In one case the pressure was 100 pounds and in the other 120 pounds. There was no apparent rupture. There were six cases in which the incisions were made in the median line below the umbilicus, the pressure being introduced through the rectum in three, and through the stomach in the other three.

All cases herniated either through the sutures in the aponeurosis, or by a separation of the muscular fibers with pressure of 15 pounds in one case, 20 pounds in three cases, 40 pounds in one case and 110 in another. There were two cases in which transverse incision was made through the skin above the pubis, and the muscles were separated in the median line. One case with the tube in the esophagus, and the rectum ligated, withstood 120 pounds (male). The other case (female), the esophagus ligated with tube *in situ*, the rectum plugged with cotton, withstood but 40 pounds, a large hernia showing in the picture at 60 pounds.

In two cases in which the incision was made over the right rectus, the aponeurosis being dissected with the finger, the wound closed in the ordinary way; one cadaver withstood 80 pounds, the intestines puncturing at the cecum with about 10 pounds pressure in the other. The pressure was applied through the rectum in both cases, with the esophagus plugged with cotton. One case with an incision 5½ inches long in the outer border of the rectus showed a hernia at the lower border of the incision, with 20 pounds pressure. In this case the ligature was placed at the duodenum, and pressure was applied through the rectum. In three cases with the incision over McBurney's point, with the muscles separated, the wounds closed; one case herniated with tearing of the muscular fibers at 20 pounds. There was no hernia in either of the other two cases. Two cases with the same incision, the muscles also incised, withstood 120 pounds, the pressure being applied through the esophagus. In three cases with the same incision as before, pressure applied through the rectum; one case herniated through the incision with 15 pounds pressure, the other two cases went over 120 pounds without pressure. In three cases of esophageal end of the stomach ligation through an abdominal incision, pressure applied through the rectum, two showed over 120 pounds pressure, and in the other the gut was punctured with about 10 pounds pressure.

In all of these cases the abdomen was left open. In seventeen cases the intestines were taken out of the abdominal cavity; only one of the number could be blown higher than 10 pounds. In all the other sixteen cases the air escaped almost as fast as it could be pumped in. This particular point shows the effect of low abdominal distention in some of the drainage cases.

95. **New Instrument for Intravenous Injections.**—The instrument devised by Frankel consists of: *A.* A perforated needle with a sharp cutting edge and point, about 2 to 3 inches long and about ⅛ of an inch in diameter; the upper edge carries a crown-like arrangement within which fit a screw and cap to tighten the needle to the inner cannula. *B.* A cannula 1 inch longer than the needle, with a dull and rounded lower edge (so as easily to enter the lumen of the vein and be pushed within the vessel at least ½ to 1 inch away from the point of injury, thereby preventing clotting, dislodgements, and spilling of the fluid within the tissues). This cannula fits snugly within the needle so as to be air-tight and still is very easily shifted in and out of the needle. The upper end of the cannula carries a crown like the needle, within which fits the third part. *C.* A perforated piece of metal whose upper part easily fits a piece of ordinary rubber tubing, while the lower end fits the upper part of the cannula. *D.* An ordinary piece of steel with sharp point called a stylet which keeps all parts together, clean and unobstructed, and can be used together with the cannula like a trocar for similar purposes.

Oklahoma State Medical Association Journal, Muskogee

September, VII, No. 4, pp. 109-139

109 Abdominal Injuries. G. A. Wall, Bartlesville.
110 Eternal and All Important Question in Gynecology—Cancer of Uterus. B. Saunders, Fort Worth, Tex.
111 Accessibility of Diseased Area About Neck of Uterus and Upper Vagina in Carcinoma of Cervix. G. H. Noble, Atlanta, Ga.
112 State Health Problems. J. C. Mahr, Oklahoma City.
113 Jackson's Membrane. F. H. Clark, Oklahoma City.

Public Health Journal, Toronto

August, V, No. 8, pp. 515-560

114 Public Abattoirs. J. T. J. Vallance, Lethbridge, Alta.
115 Conditions Affecting Efficiency of Sewage Disposal Works in Canada. R. H. Murray.
116 Economics of Sewage Disposal. R. Potter, Battleford, Sask.
117 Results of Mechanical Gravity Filtration at Saskatoon, Sask. G. B. Clark, Saskatoon.
118 Non-Identity of Modern Leprosy and Biblical Leprosy. H. W. Hill, London, Ont.
119 Legal Aspect of Sanitary Inspectors' Work. T. Watson, Saskatchewan.
120 Engineer and Social Service. S. Parry, Regina, Sask.
121 How May Medical Health Officer Help Social Worker. J. H. T. Falk, Winnipeg.

September, No. 9, pp. 563-608

122 Exceptional Child. W. D. Tait, Montreal, Que.
123 City Waste Disposal by Incineration. F. Cartlidge, Moose Jaw, Sask.
124 All the Typhoid of Community for Five Years from Carrier Through Milk. H. W. Hill, London.

South Carolina Medical Association Journal, Seneca

August, X, No. 8, pp. 605-635

125 Chronic Infections and their Relation to Internal Disorders. J. H. Gibbes, Columbia.
126 Fallacy of Prescribing Alcoholic Beverages as Food or Medicine. R. M. Hammond, Montmorenci.
127 Oral Hygiene. G. A. Milner, Aiken.
128 Plea for Future. J. H. Hunter, Spartanburg.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

August 29, II, No. 2800, pp. 385-420

1 *Common Ailments in Camp: Their Significance and Prevention. C. Webb-Johnson.
2 *Gangrene in War. C. M. Page.
3 Analysis of Results of New Sight Tests of Board of Trade. F. W. Edridge-Green.
4 *Late Infection Following Elliot's Trephining Operation. A. H. Griffith.
5 *Causes of Blindness in Eleven Hundred Children. N. B. Harman.
6 Factor of Heredity in Myopia. J. A. Wilson.
7 Choice of Cataract Operation. E. E. Maddox.
8 English Pellagra in Early Childhood. C. R. Box.
9 Two Unusual Cases of Mastoiditis in Children. W. Wilson.
10 Intraperitoneal Rupture of Bladder. N. Flower.
11 Simple Method for Determining Amount of Glucose in Diabetic Urine and Other Liquids. A. F. Dimmock.

1. Ailments in Camp: Their Significance and Prevention.—Webb-Johnson says, it is a well known fact that common ailments in camp are responsible for a great wastage of public money and a loss of training for a large percentage of men; the greatest number of admissions to hospital is among men with less than one year's service, and the lowest is among men with eight years or more experience; also that the rate of admission into hospital is highest among men between 20 and 25 and lowest among men between 40 and 50.

2. Gangrene in War.—Page says If the types of gangrene seen under war conditions be classified in accordance with their etiology, they group themselves under the five following headings: 1. Gangrene secondary to the interference with the blood flow through the main vessels of a limb. 2. Traumatic gangrene. 3. Infective gangrene. 4. Gangrene due to vasomotor paralysis. 5. Gangrene secondary to the effect of high explosives. The occurrence of the disease in young men with healthy circulatory systems is the one feature which is common to all these types, and which differentiates them on the average from gangrene as met with in civil practice. This fact considerably affects the line of treatment and the prognosis.

1. Gangrene of the extremities is occasionally seen as a result of direct slow velocity gunshot injury to the main brachial or femoral vessels; it more often occurs when a bone injury is present as well. High velocity rifle bullets may pass through large vessels and at the time produce few symptoms; subsequently an aneurysmal varix will very likely appear. The symptoms of this latter condition may be evident within a week or so of the injury, and if operation is undertaken at this stage, probably involving ligature of the artery above and below the sac, gangrene of the affected limb is likely to occur. 2. Traumatic gangrene is a term theoretically applied only to those cases in which death of a part results from direct injury, but it is evident that infection will be an important factor in the extent and progress of the condition. 3. Acute infection with many organisms may cause some degree of local tissue necrosis. The term "infective gangrene," however, is usually reserved for those cases in which the process is definitely progressive and associated with toxemia. Under such a classification come phagadena and the gangrene due to the bacillus of malignant edema and the *Bacillus aerogenes capsulatus*. 4. The cases of symmetrical gangrene which were seen by Page in large numbers among Turkish troops in the last months of 1912 resulted from a vasomotor disturbance. There were some differences of opinion in regard to the cause responsible for the condition. About half the men affected were suffering from enteritis. All gave a history of being exposed for long periods on wet ground and of having been on insufficient rations. Many had been in wet trenches for twenty-four hours on end; the temperature was usually 5 C. above freezing point. The gangrene was practically always symmetrical and affected the lower extremity in nearly all cases; the fingers were involved occasionally, but, as far as Page saw or could learn, never independently of the feet. The gangrene was usually dry, but in several of the more extensive instances it became moist, and there were several deaths from tetanus in this latter class of cases. When once the men were in the hospital the condition did not tend to advance except in the few instances in which emphysematous infection was superadded. Toxemia was not marked except under the latter circumstances. Page considers the condition to be strictly comparable to that of frostbite. The arterial circulation of the men affected was rendered extremely poor by the condition of starvation and fatigue; under these circumstances a temperature above freezing was able to produce stasis in the peripheral vessels. No doubt in some instances tight boots and puttees assisted, but many of the men affected had been wearing the loose native footwear. 5. Extensive gangrene of the extremities has been stated to occur in men after they have recovered from the effects of violent explosives. V. Berdisavljever, reporting from Servia, says he saw cases of hematuria, hemothorax, and shock as the result of explosions, but he says that in no instance did he see gangrene. Dr. Maclean had under his care in Constantinople a remarkable case of gangrene of all four extremities attributed to this cause. It will be appreciated that in general gangrene is merely an occasional complication of some other surgical condition, and that it only assumes epidemic importance under rare conditions of service.

4. Infection Following Elliot's Trephining Operation.—Griffith has trephined 125 times for primary glaucoma, by the method of Elliot, besides in a good many secondary glaucomas and for other diseases. He was well pleased with the results, and regards the operation as much more satisfactory than iridectomy in chronic glaucoma. A patient aged 55, had chronic glaucoma in both eyes. Both eyes were operated on within a short time of each other by upward trephining by Elliot's method, a small iridectomy including the pupillary margin being done, and the conjunctival flap was sutured. The patient was discharged in a month. Both eyes made perfect recovery and kept well for close on two years. He then presented himself with purulent iridocyclitis of the left eye. No light perception. Tension 3, exudation in the pupil, injection of the entire conjunctiva, edema of the lids, discoloration and inflammation of the iris; the pillars of the coloboma were free and well retracted. The eyeball was removed three days later. The eye had been affected four days. The other eye was still quite satisfactory in every way. The naked eye preparation of one-half the globe showed purulent cyclitis, the exudation covering the entire free surface of the ciliary body and posterior surface of the lens.

5. Causes of Blindness in Children.—The total number of blind and partially blind children from the blind schools of London brought by Harman into this inquiry is 1,100. The

causes responsible for their state of blindness may be placed in three groups: 1. Injury or destruction of the cornea consequent on surface inflammations. 2. Inflammation within the eyeball or optic nerve. 3. Congenital defects of the eyes. In the first group, injury or destruction of the cornea consequent on surface inflammations, ophthalmia neonatorum is responsible for by far the greater number of cases of blindness, and in particular for the cases of total blindness. The group contains 351 children, and the causes of the blindness are as follows: Ophthalmia neonatorum 266, 24 per cent., purulent conjunctivitis of later years 47, 4.2 per cent., phlyctenular keratitis 38, 3.4 per cent. The percentage for the grand total, 351, is 31.9 per cent.

The diagnosis of those cases marked "ophthalmia neonatorum," so far as the examination of the child at the time of school age is concerned, must rest on the character of the eye damage, the associated symptoms, and the history of the case as obtained from the parents or other responsible party. The cases of purulent conjunctivitis occurring in later months or years of child life were due to a great variety of causes. Eczema and streptococcal infections 4, scarlet fever 5, measles 10, German measles 1, meningitis 1, diphtheria 2, small-pox 4, erysipelas 1, chicken-pox 1, pneumonia 2, gonorrheal (contracted from vaginal discharge or pus from the eye of an affected baby) 2; total 47.

Group 2 contains a great variety of cases—inflammations of the cornea, of the iris, of the choroid and of the optic nerve; but it is sufficient for the purpose of these statistics to place them in two categories, according as the inflammation affected the anterior half of the eye or the posterior half. Those affecting the front half of the eye total 217, or 19.8 per cent.; by far the greater number are due to interstitial keratitis; there are a few only of iritis. Syphilis accounts for 17.8 per cent. Of those inflammations affecting the posterior half of the eye by far the greater number were due to a form of choroiditis known as "disseminated." This cannot be said to be diagnostic of syphilis, for other conditions are capable of causing the same or very similar conditions, but all evidence goes to prove that these cases are overwhelmingly syphilitic in origin. With the choroiditis there is always more or less atrophy of the retina and of the optic nerve, so that vision is gravely reduced. Closely associated with these cases are many cases of total optic atrophy. This group includes 222 cases, or 20.5 per cent. Of these, 126, or 56.7 per cent., were definitely syphilitic.

Group 3 includes 233 cases, or 21.2 per cent.; only 16, or 1.45 per cent., were known to be of syphilitic association. The figures show that there has been a definite diminution of the incidence of cases of blindness caused by ophthalmia neonatorum, and it is reasonable to credit this diminution to the great efforts that have been made to prevent the disease during the past few years. The apparent increase of the incidence of the cases of congenital syphilis is in part due to the diminution of the cases of ophthalmia, and in part to the use of finer methods of diagnosis. It is certain that the number of cases of blindness due to ophthalmia is diminishing both actually and relatively to the causes of blindness.

Journal of Tropical Medicine and Hygiene, London

August 15, XVII, No. 16, pp. 241-256

12 *Nitrogenous Metabolism in Chyluria. W. J. Young.
13 *Entamebiasis. Lim Boon Keng.

12. **Nitrogenous Metabolism in Chyluria.**—Young made a study of the albuminous matter and other nitrogenous constituents of the urine in two cases of chyluria. One case was that of a woman aged 42, otherwise healthy, who for twenty years had noticed that her urine became milky in appearance and clotted into jelly-like masses if left standing. She did not at first notice blood in the urine. Whereas formerly she had had no trouble on account of this, within the last ten years she had experienced dull, aching pains in the small of her back and had observed at times that the urine was stained with blood. On admission to the hospital specimens of blood taken both day and night were examined for filaria larvae, but it was never found to contain any.

The other patient was a miner aged 23. Eight years previous to admission he noted difficulty in passing urine and that it contained small, jelly-like, blood-stained clots, and also that the urine became milky on standing. He had dull, aching pains in his back. Otherwise the patient was quite well. Filaria larvae could not be found in the blood. Both were cases of true chyluria. The urines always contained fat which could be extracted with ether, but the milky appearance could not be entirely removed in this way. By the technic described by Young 1.8 per cent. of fat was found in the urine of Case 1 and 2.6 per cent. in that of Case 2. A quantity of protein was present which showed the properties of the proteins of the lymph. It coagulated when the urines were heated to 70 to 75 C., and contained globulin precipitated by half saturation with ammonium sulphate, and an albumin when the liquid was completely saturated with this salt. In Case 1 a fairly complete analysis of the nitrogenous constituents of the urine was made daily for fourteen days by a technic described in the article.

The patient whose weight, unfortunately, was not taken, was maintained on a diet consisting of lean meat, bread and potatoes, the nitrogen content of which was approximately 15 gm. The quantity of protein nitrogen excreted daily varied from 0.49 to 1.94 gm., the average for the fourteen days being 0.95 gm. per diem, corresponding approximately to 6 gm. protein. The complete results are given in a table, which shows a low grade of nitrogenous metabolism. The non-protein nitrogen representing protein actually utilized in metabolism was very small in quantity, the daily average excretion being 6.39 gm. This represents approximately 40 gm. protein catabolized. Aside from the protein nitrogen the other constituents of the urine showed a normally balanced nitrogenous metabolism.

In Case 2 the patient was kept on two different diets. During the first eight days the diet consisted of lean meat, eggs and bread carefully weighed out and equal in quantity to 15.4 gm. nitrogen per diem, while in the succeeding six days a diet of eggs, milk, bread and butter was employed. The daily quantity of urine varied from 1,120 c.c. to 3,195 c.c. The daily loss of lymph proteins as determined by the albumin in the urine averaged 2.40 gm. nitrogen, equivalent to 15 gm. protein. It varied from 10 gm. to 21.5 gm. The details are given in a table. During the first eight days the protein catabolized daily, as represented by the non-protein nitrogen, averaged 11.89 gm., approximately 74 gm. protein, which is about normal. The patient consumed the whole of the food given and did not find the amount excessive. During the second period, however, when the diet was controlled by the appetite of the patient, the quantity of nitrogen excreted decreased steadily, the non-protein nitrogen falling as low as 6.1 gm. daily, corresponding to only 38 gm. protein catabolized, a figure below normal. It was still decreasing when the experiment ceased.

13. **Entamebiasis.**—The relation of rheumatic pains, erythema and prurigo with dysentery and hepatic abscess, has been noted since the days of Graves and Murchison. Keng's observation is that all rheumatic inflammations and rheumatism as seen in Singapore, are associated with a protozoon organism, found in the intestinal canal in many persons, but mainly in those suffering from rheumatism, bronchitis, asthma, an irregular remittent fever, various inflammations, sciatica, lumbago, urticaria, erythema marginatum, erythema nodosum, prurigo, impetigo herpetiformis, lichen rubra acuminata, and chronic gastrodynia. One patient had painful micturition as if passing gravel, the urine being red and having a brick-dust deposit. In many of these patients, the organism is also found in the sputum, the urine, in the blood and in the skin eruptions.

It is Keng's impression that at least two distinct species (that producing dysentery, liver abscess and their inflammations; and that giving rise to rheumatism and its allies) may be clinically admitted although it is possible that in dysentery we have to deal only with a special phase of the multiplicative stage. This question of the relationship between dysentery and the rheumatic states cannot be settled. It is almost

impossible at times to say from microscopic examinations that the ameboid bodies found in endometritis, bronchopneumonia, and skin sinuses are not the *Entameba histolitica*. The different diseases named are often found in persons who have had an attack of dysentery, although the greater number of those rheumatic and gouty patients have never had dysentery.

The association of the parasite in its different stages with different diseases is as follows: I. Fungus-like plasmodium, constipation. (a) Few free amebas in the feces, flatulence, biliousness, hepatic congestion, headache, vertigo, dizziness, pyrosis, nervous symptoms, urticaria. (b) Granular ameba also present in sputum, pharyngeal irritation, colds and bronchitis. (c) Free ameba plentiful in feces, sputum and blood, rheumatism, with arthritis and heart disease, toxemia, typhomalarial type of fever, acute urticaria, pruriigo, boils, etc., tonsillitis, sciatica and gravel. II. Multiplicative phase. Large granular ameba undergoing fission, schizogony and budding by means of chromidia shedding, acute dysentery, acute gastritis and colitis, bronchopneumonia, bronchiectasis and phthisis, adenitis metritis and pelvic abscess, peritonitis, nephritis, appendicitis, hepatic abscess, pyemia. III. Encysted stage. Recovery for the time being or improvement in the patient's condition. Relapse occurs when the cysts burst and the parasites resume the active rôle. IV. Parasites in all stages flourish in the blood in extensive areas and affect the kidneys, with cachexia, anasarca, anemia, debility, sweats.

As far as Keng can make out the parasite is a mycetozoon and is a form of chlamydomysca. The fungus stage closely resembles a mycetozoa which he has found in house drains and is almost indistinguishable from a parasite in the intestinal canal of fowls. Provisionally, we may call it *Chlamydosporia toxifera* on account of its toxic effect on man.

Lancet, London

August 29, II, No. 4748, pp. 537-616

14 General Council of Medical Education and Registration of United Kingdom. Powers and Duties of General Medical Council.
15 Medical Examining Bodies and Schools of United Kingdom.

Sei-I-Kwai Medical Journal, Tokyo

August, XXXIII, No. 8, pp. 45-51

16 Some Facts in Acute Appendicitis. Y. Takaki.

Annales de Médecine, Paris

July, II, No. 1, pp. 1-106

17 *Habit of Swallowing Aerated Saliva. (Sialophagie.) G. Hayem.
18 *Reinfection with Tuberculosis. III. (La réinfection cutanée et le phenomène de Koch.) E. Rist and J. Rolland.
19 Hereditary Malformation of Chin and Nose with Exophthalmos and Strabismus. (La dysostose cranio-faciale héréditaire.) C. Chatelin.
20 The Reaction of the Bone Marrow in Tuberculous Anemia. A. Cain.
21 Eosinophilia in the Diatheses and in Conditions Suggesting Anaphylaxis. F. Bezançon and R. Moreau.

17. Habitual Swallowing of Aerated Saliva.—Hayem regards this as a form of aerophagia and as by far the most common type. This sialophagia should be suspected, he says, in every case of gastro-intestinal tympany. Auscultation over the stomach will generally reveal the gas entering and leaving the stomach, and sometimes the gas can be heard in the stomach. The sound more frequently heard from it is a borborygmus as the aerated saliva enters the stomach from the esophagus. He regards this sialophagia as a reflex act from some abdominal organ and suggests that it may reveal something wrong in this organ, especially if it happens to be the stomach, before any other signs point to it.

18. Reinfection with Tuberculosis.—The extensive experimental work here reported was for the purpose of studying the reaction of the skin of tuberculous guinea-pigs to reinfection with large doses. Special attention was paid to the histologic aspect of the reinoculation lesions and the behavior of the tubercle bacilli in them. When the reinoculated guinea-pig was under the influence of preexisting tuberculosis, the reinfection manifested itself always as an acute hemorrhagic inflammation with necrosis. The lesion appears in twenty-four hours instead of the incubation of from eight to twelve days with a primary inoculation. The lesion also heals completely sooner or later, thus differing from the incurable skin lesion of a primary infection. In the reinoculation lesion the tubercle bacilli all die off in time. These differences from the behavior of a primary skin lesion confirm the assumption of a state of allergy.

Annales de Médecine et Chirurgie Infantiles, Paris

August 1, XVIII, No. 15, pp. 501-536

22 Infants and City Noises. (Les inconvénients du bruit. Comment en préserver nos petits malades?) E. Périer.
23 Roentgenoscopy of the Appendix. J. Roux.

Deutsche Zeitschrift für Chirurgie, Leipsic

July, CXXX, Nos. 3-4, pp. 225-432

24 *Primary Sarcoma of the Pelvis. (Beckenknochensarkome.) M. Schmidseder.
25 Experimental Research on Suppurative Parotitis. F. Rost.
26 Operative Treatment of Dislocation of the Talus. W. Schmitt.
27 Ileus from Gall-Stones. A. Wagner.
28 Abnormal Location of the Appendix. A. Troell.
29 Operative Treatment of Acute Gastric Hemorrhage. G. Alberts.
30 Torsion of Colon, Movable Cecum and Ileus. R. Ingebrigtsen.
31 Retrosternal Dislocation of the Clavicle. Haehner.

24. Sarcoma of the Pelvis.—Schmidseder devotes nearly a hundred pages to summaries of 178 cases from the literature of sarcoma in the bones of the pelvis, and adds a detailed account of another case from his own practice. In most of the cases the favorable moment for operative treatment had been allowed to pass.

Medizinische Klinik, Berlin

August 2, X, No. 31, pp. 1299-1344

32 *Surgical Treatment of Cavities in the Lungs. P. Frangenheim.
33 Pathology of Ileus. E. Fritzsche and E. Stierlin.
34 Effectual Action of a Swiss Sulphur Mineral Water in Rebellious Eczema, Acne, and as Adjuvant for Surgical Bone and Joint Disease. (Zur Wirkung der Schwefeltherme von Schinznach.) E. Bircher.
35 *The Seashore and Cardiovascular Disease. (Zur Prognose der Herz- und Gefässkrankheiten.) M. Bockhorn.
36 Acromegaly Plus Splanchnomegaly with Hypophysis Tumor in Male Cadaver of 32. Eltester.
37 Failure of Attempts to Record Pulse in Aorta. H. Bergmann.
38 *Mechanism of Attack of Asthma. (Ist es gerechtfertigt, als Ursache des bronchialasthmatischen Anfalls eine Verengerung der feineren Luftwege, sei es in Form eines Bronchospasmus, sei es in Form von Schleimhautschwellung anzunehmen.) Winter.

32. Surgical Treatment of Cavity in the Lung.—Frangenheim regards operative treatment as indispensable for a cavity in the apex if it persists little if any modified after all the other tuberculous processes in the lungs have healed. Baer has reported success from surgical treatment of cavities in both lungs. The chances are better when the sheets of the pleura are adherent, but a cavity in the apex with open pleural cavity does not absolutely contra-indicate intervention. With a very large and thin-walled cavity, there is danger of the wall's suffering from inadequate blood-supply. Roentgenoscopy and the exploring finger warn of this. In treatment of a cavity in the upper lobe, he insists that pneumolysis offers better chances than operations on the chest wall. By "pneumolysis" he means operative mobilization of the upper lobe after the cavity has been emptied by gravity, the patient reclining on his side for an hour. A stretch of a few centimeters is resected from the second or third rib in front and, through a lengthwise incision in the periosteum behind, the finger is worked through between the fascia and the costal pleura and the upper lobe is loosened up all around to correspond to the extent of the cavity. An opiate before the operation prevents reflex phenomena and the whole operation can be done under local anesthesia, dabbing the pleura with the anesthetic solution. He has never had any hemorrhage worth mentioning.

When the part of the lung with the cavity is thus mobilized, the cavity may be obliterated by compression from a paraffin or other filling injected between the pleura and the chest wall. Various drawbacks have been encountered with different fillings; paraffin is so heavy it is liable to slide down below the cavity. It has also been known to work its way outward

through the breach in the ribs and entail a suppurating fistula. Friction from the paraffin has also caused gangrene of lung tissue in some instances. Compression of the lung by an inflatable bag introduced into the extrapleural space is liable to lead to infection. Wilms uses fat tissue as the filling, and this seems the best of all for the purpose, provided it is not too rapidly absorbed. Mayer insists that the pneumolysis alone, without any filling, is all that is necessary at first. Later, if the lung shows a tendency to expand and open up the cavity again, nitrogen could be injected to fill the space. Both Wilms and Baer insist that the filling procedure need not be restricted to old, chronic, shriveling cases, but can be applied in a recent process with cavities: there need be no fear that the procedure in itself will aggravate the tuberculosis. The cavity is influenced by the pneumolysis much more than by a thoracoplastic operation, while the heart, the lungs elsewhere and the muscles controlling expectoration are not impaired by it. When the technic for filling the extrapleural space is further perfected, the pneumolysis method will certainly be found extremely valuable for treatment of cavities in the lungs, especially in the upper lobe, while with diffuse pulmonary disease extensive thoracoplastics answers the purpose better.

35. **Prognosis of Cardiovascular Disease.**—Among the points emphasized by Bockhorn is that the heart and the vascular system are one, as is evident from the embryonal development. Thus what acts on the peripheral circulation acts on the heart as well. He refers in particular to the effect of sea bathing and sea air, saying that he knows of far more people living to 90 and over in good health in seashore towns than in the inland, other conditions approximately equal. Neurasthenics should be sent systematically to the seashore for a course of training; if this were done regularly, cardiovascular disease might be warded off in a large proportion of cases. In arteriosclerosis, the process might be arrested and other vascular regions saved from involvement if there were seashore sanatoriums and convalescent homes available. Bockhorn states that tests have shown that the North-Sea bathing represents a course of cold, carbonated, brine baths and such are regarded by many as the most effectual form of balneotherapy in treatment and in prophylaxis of cardiovascular disease.

38. **Mechanism of Asthma.**—Winter ascribes the attack in asthma to some irritation of the vagus; this causes, by reflex action, some disturbance in the blood-vessels in the lungs. The blood-vessels become enlarged and more easily permeable, and this readily explains the symptoms observed.

Münchener medizinische Wochenschrift, Berlin

July 28, LXI, No. 30, pp. 1657-1712

39 Corpus-Luteum Preparation in Treatment of Irregular Menstruation. L. Seitz, H. Wintz and L. Fingerhut. Concluded in No. 31.

40 *The Fat Acids and Coagulation of the Blood. (Chemische Erklärung des Gerinnungsvorganges.) B. Stuber and R. Heim.

41 *Serodiagnosis of Pregnancy. (Weitere Erfahrungen mit der Abderhaldenschen Reaktion allein und im Vergleich mit der Antitrypsin Methode.) R. Freund and C. Brahm. (Zur Substratfrage bei der Anwendung des Abderhaldenschen Dialysierverfahrens.) P. Lindig.

42 *Colorimetric Determination of the Sugar in the Blood. (Ueber kolorimetrische Bestimmungsmethoden; IX.) W. Autenrieth and W. Montigny.

43 *The Tuning Fork-Stethoscope Method. (Zur Stimmgabel-Stethoskop-Methode.) Olpp.

44 *Gunshot Wounds of the Heart. (Zur operativen Behandlung der Herzschüsse.) T. Müller.

45 Restoration of the Ear. (2 Auroplastiken.) E. Eitner.

46 *Infectious Erythema. A. Heisler.

47 *Serodiagnosis and Differentiation of Cancer. M. Weinberg. Commenced in No. 29.

48 The Disadvantages of the Constantly Increasing Cost of Building and Running Public and Private Sanatoriums. (Der Nachteil der dauernd steigenden Anlage- und Betriebskosten von Sanatorien.) C. Schütze.

40. **The Chemistry of the Coagulation of the Blood.**—Stuber and Heim have continued their research on the influence of lipoids on various biologic processes, on phagocytosis and coagulation, and here report that there is a direct connection between the fat-splitting and the coagulation-inducing properties of ferments. Steapsin proved the most active in both lines. Chemically pure stearic acid, and tristearin in a lesser degree, are able to induce coagulation of the blood as promptly as or even more effectually than thrombokinase. In respect to their influence on the coagulation of the blood, the fat acids can be classified in a homologous series, their place in which is determined by the number of carbon atoms in the molecule. The arrest of coagulation by leech extract comes under the workings of this law. The first phase of the coagulation process is thus a lime-fat soap production; the second phase is the lime-fat soap fibrinogen, the lipolytic ferment serving as catalyzer. The latter — blood-lipase — seems to be under the control of certain glands with an internal secretion.

41. **Serodiagnosis of Pregnancy.** — Freund and Brahm report the application of Abderhalden's technic in 114 pregnant women and in 36 controls, men and non-pregnant women. The test gave negative findings in 18.4 per cent. of the pregnant women and a positive reaction was obtained in 53.1 per cent. of the men and the non-pregnant women. Thus the test failed in nearly 27 per cent. of 135 cases. They report further some additional series showing equally disappointing results with various modifications of the technic. They applied the antitrypsin method along with the Abderhalden in 48 pregnant and 16 non-pregnant women, or in men, and incorrect responses were obtained once with the antitrypsin method and seven times with the Abderhalden among the pregnant, and seven times with the former and ten times with the latter among the controls, including some normal or syphilitic men. Neither test proved absolutely reliable, but the antitrypsin test was much more so than the Abderhalden while its technic is simplicity itself in comparison, especially E. Rosenthal's modification of the original Fuld-Gross method. Heimann and Chotzen obtained correct responses with it in all of 66 controls and in 47 of 50 pregnant women, and R. Franz's tests of 223 pregnant women have confirmed the value of the test; a negative reaction may be accepted as positively excluding pregnancy. Franz remarks, however, that as the test is merely a sign of increased metabolism of albumin and is not specific for pregnancy, a positive response must not be regarded as a sign of pregnancy unless it is possible to exclude other conditions accompanied by augmented destruction of albumin, such as cancer, tuberculosis, nephritis, exophthalmic goiter and fever from any cause. . . . Lindig uses desiccated and pulverized placentas for the test, or casein in substance.

42. **Colorimetric Determination of the Sugar in the Blood.** —With the technic described the sugar content in normal adult males ranged from 0.05 to 0.07 per cent. A diabetic with 6.2 per cent. sugar in the urine had 0.2 per cent. sugar in the blood. In four healthy infants the sugar content ranged from 0.029 to 0.036 per cent. In order to obtain comparable findings, Autenrieth and Montigny emphasize the importance of agreeing on a standard test meal and standard interval before applying the test, as food containing much sugar, such as honey, increases materially the percentage of the sugar in the blood.

43. **The Tuning Fork-Stethoscope Method.** — Olpp commends Cantlie's method of using the tuning fork in connection with the stethoscope to determine the outline of the viscera, of tumors, etc. The method can be applied to one's own body. Gynecologists may find that this method will reveal a tumor in the uterus or elsewhere that escapes all other methods of investigation.

44. **Operative Treatment of Stab and Gunshot Wounds of the Heart.**—Müller relates an instance of an apparently insignificant wound of the heart which entailed fatal internal hemorrhage while another, much more serious apparently and sutured at once, terminated in recovery. The bullet was not found in the latter case and still can be seen with the Roentgen rays about two finger-breadths above the diaphragm. The heart was sutured with catgut in this case and the young man has been apparently in perfect health during the months since. In this as in most of the cases on record

the bullet hole through the soft parts suppurated but the inflammation did not extend below. Recovery is known in 53 per cent. of 51 operative cases on record; in the latest 10 cases, 9 of the patients were cured. Müller's other patient was a girl of 10 who fell on a glass roof and cut herself slightly at several points. The quarter-inch cut in the third left interspace was not considered serious at first but an operation two hours later revealed a glass splinter which had cut the left ventricle. The 1-cm. wound was sutured with silk and the heart-beat grew stronger at once but the child had lost so much blood that she was unable to rally and died in two and a half hours after the operation. The sharp splinter of glass had struck the third rib and been deflected into the left ventricle.

46. **Infectious Erythema.**—Heisler reports an epidemic of this affection last spring embracing twenty-five cases. It sometimes came on with a stormy onset, fever and glandular enlargement accompanying the maculapapulous erythema on the cheeks, possibly becoming confluent and giving the face a peculiar bloated appearance. The color of the erythema was a bluish red; in a day or so it extended down on the upper arms and toward the back of the neck and shoulder-blades. The second or third day the buttocks and outside of the thighs developed the erythema likewise, but nowhere was it confluent except on the face. The eruption is briefly transient and sometimes comes and goes and returns, all with equal suddenness. No connection with any other infectious disease was apparent in his experience. The epidemic broke out first in a boys' boarding school in the middle of a term. The incubation period was from five to fourteen days, generally seven, and direct transmission from child to child could be traced in each new case. The swollen region in the face generally showed some desquamation later and there was a tendency to pigmentation in a few cases. The spleen was not enlarged in any instance and the urine was normal except for the presence of indican in a few cases. The fleeting nature of the erythema aided in differentiation but the most characteristic finding was the sudden enlargement of the glands below the ear and toward the occiput. This preceded by a day or so the erythema.

47. **Serodiagnosis of Cancer.**—Weinberg gives the details of 12 cases in which malignant disease seemed certain but the Abderhalden test gave negative findings, and the further course of the cases disproved cancer. In 28 cases of cancer the test was positive in all but 2 and in one of these the cancer had developed so suddenly and actively that possibly there had not been time for the specific ferments to develop. In 15 controls the reaction was constantly negative. Contrary to the experiences related by others, Weinberg found that carcinoma serum digested carcinoma-tissue alone, and sarcoma serum, sarcoma-tissue alone; the special organ involved seemed immaterial. The specific tissue is the main point; spindle-celled sarcoma would not respond to round-celled and vice versa, and the same occurred with cylinder-celled carcinoma, etc. Lack of realization of this peculiar specificity may explain the conflicting experiences published by some workers in this line. In 8 cases the reaction persisted positive after the removal of the cancer and in each instance this was explained by the discovery of metastases.

Wiener klinische Wochenschrift, Vienna

July 30, XXVII, No. 31, pp. 1133-1174

49 *Vaccination Technic for Tuberculin Treatment of Tuberculosis. (Neuere Varfahren der Tuberkulosehandlung und die für Pathologie und Therapie daraus zu ziehenden Schlüsse.) H. Weichert. Concluded in No. 32.

50 *Technic to Exclude Disturbing Elements in Electrocardiography. (Methode, die physikalischen Einflüsse auf die Form der Elektrokardiogramme auszuschalten.) K. Mayer.

51 *Intramuscular Injections of Blood in Treatment of Leukemia. G. Kiralyfi.

52 Retention Tumor in Parotid Gland. (Speichelganggeschwulst.) V. Lazarevic.

53 Quarantine Regulations in the United States. E. Weiner.

August 13, No. 33, pp. 1207-1226

54 *Neosalvarsanized Serum in Treatment of Syphilis of the Nervous System. Gurari.

55 Isolated Fracture of the Semilunar Bone. (Mondbeinfraktur.) A. Plunger.

56 Durable Collargol Preparations of Spirochetes, etc. (Herstellung der haltbaren Kollargolpräparate von Spirochäten und Hyphomyzeten.) J. Saphier.

49. **Vaccination Treatment of Tuberculosis.**—Weichert explains on the basis of the side-chain theory Ponndorf's success in treating tuberculosis by systematically repeated vaccination—like an intensified Pirquet tuberculin test, repeated about once a month. He assumes that the skin and mucous membrane are the seat of especially vigorous antibody production as they bear throughout life the brunt of bacterial attacks. Other arguments to sustain this assumption are presented, including the success of vaccination against small-pox. The article is continued.

50. **Improved Technic for Electrocardiography.**—With the ordinary technic one never knows from what part of the heart the electric current is proceeding, and hence it is impossible to obtain records under exactly similar conditions for comparison with other cases or even with other records of the same organ. Mayer says that he has overcome this difficulty by taking the record as the patient reclines in a zinc tub filled to a certain mark with water. The volume of the body plus the water is thus always the same, and the area of conduction is so large and so far from the heart that minor differences become equalized.

51. **Injections of Blood in Leukemia.**—Kiralyfi calls attention to the stimulating effect on the bone-marrow of intramuscular injections of defibrinated blood when the patient has been taking benzol or Roentgen treatment to excess; that is, when the benefit apparently being realized from the treatment suddenly gives place to an acute exacerbation, which is a frequent occurrence. In a case reported in detail, a merchant of 59 with myeloid leukemia for about six months improved after six days of benzol treatment, the whites dropping from 31,000 to 13,000, and the benzol was discontinued. The whites continued to drop until they numbered only 2,150 and the reds dropped to 1,000,000 and the patient suffered intense pains in his limbs. A venesection had just been done to relieve a patient with polycythemia, and 10 c.c. of the blood drawn from this patient was injected into the gluteal muscle of the leukemia patient. By the next day the whites had climbed to 7,000 and by the fourth day to 11,900 and the reds numbered 150,000 more, showing that the exhausted bone-marrow had begun to recuperate. The injection was repeated with ordinary blood nine days and again three weeks later, and the improvement continued. The complexion became natural, the swollen glands subsided, and the previously bed-ridden patient was able to be up and about. The reds have kept since at about 2,000,000 and the whites from 9,000 to 10,000.

54. **Treatment of Syphilis of the Nervous System.**—Gurari has been applying Swift and Ellis' technic and later a modification of it and reports considerable improvement in a number of the cases. Ten are described in detail with the findings on repeated lumbar puncture. He makes an intravenous injection of neosalvarsan and an hour later draws the blood, but instead of aspirating it he introduces the needle alone into the vein after a constricting band above has been drawn tight. Then the band is removed and the patient works his fingers, the forearm pendent. Blood then pours out of the needle almost as if it came from an artery; the blood is received in a glass vessel with a broad bottom. It is set aside for twenty-four hours, when the serum is ready for use, clear and without a trace of hemolysis. He has applied this procedure forty-five times, estimating the results by the chemical, histologic and serologic findings in the cerebrospinal fluid as the criteria. In six of the ten cases reported in detail the pleocytosis was materially reduced; in three nearly to normal with one injection, in the others not until the second or third injection. The Nonne reaction subsided also parallel to the pleocytosis. The Lange and Wassermann were the hardest to influence, especially the Lange. It persisted in some cases after five injections, long after the Wassermann had disappeared. The clinical course

showed improvement in the subjective symptoms, the pains and other sensory disturbances, but the symptoms from the far-advanced anatomic changes naturally were not influenced.

Zentralblatt für Chirurgie, Leipsic

August 8, XLI, No. 32, pp. 1313-1352

57 Resection of Cardial Section of Esophagus for Cancer. W. Meyer (N. Y.).
58 Access to Thoracic Esophagus. (Zur Freilegung des Brustabschnittes der Speiseröhre. R. Wilmanns.

August 15, No. 33, pp. 1353-1384, and Supplement, pp. 1-112

59 *Technic for Pyelography. A. V. Lichtenberg.
60 Technic for Correction of Double Harelip. (Doppelseitige Hasenscharte.) H. Hans.
61 Transactions of XLIII Annual Meeting German Surg. Ass'n.

59. **Technic for Pyelography.**—Lichtenberg says that he has applied pyelography about a thousand times and this experience has confirmed the necessity for preliminary thorough purging, also the advantage of using a catheter impregnated with bismuth in certain segments alternating regularly with non-opaque segments. This permits distances to be readily estimated. The larger the supposed dilatation of the kidney pelvis, the longer must be the delay before injecting any fluid. With hydronephrosis, even in its incipient stage, there may be obstruction to the reflux of the fluid injected and a typical attack of colic may ensue. After a few hours or days the fluid injected may be emitted with urine at intervals, this keeping up for eight or ten days. He has observed intervals up to two and a half days. This intermittent stoppage, as shown by pyelography under the Roentgen rays, is an absolutely reliable sign of latent incipient hydronephrosis, according to his experience. The fluid injected is also liable to be retained in cavities and ulcers; he regards this as an advantage rather than otherwise, as the silver salt he injects for the pyelography exerts a direct healing influence. If the mucosa is sound it is smooth and the injected fluid rapidly reaccumulates in the bladder. He warns that pyelography is contra-indicated if there is hemorrhage.

Zentralblatt für Gynäkologie, Leipsic

August 8, XXXVIII, No. 32, pp. 1121-1152

62 Mesothorium in Treatment of Uterine and Vaginal Cancer. B. Schweitzer.
63 Radiotherapy for Chorio-Epithelioma. A. Hörrmann.
64 Danger of Roentgen Rays from Standpoint of Eugenics. (Röntgenstrahlen und Eugenetik.) M. Hirsch.

August 15, No. 33, pp. 1153-1184

65 Means for Control of Sponges at Gynecologic Laparotomies. (Tupferkontrolle.) G. Schubert.
66 Waterproof Permanent Dressing for Umbilicus. (Ein wasserdichter Nabeldauerverband für Neugeborene.) C. Holste.
67 Decidua Responsible for Pregnancy Seroreaction. (Die innere Sekretion der Decidua im Hinblick auf die Arbeit von J. Schottländer: "Zur Theorie der Abderhalden'schen Schwangerschaftsreaktion usw.") A. Gentili.

Gazzetta degli Ospedali e delle Cliniche, Milan

August 4, XXXV, No. 93, pp. 977 984

68 Fracture of Sternum. A. Balduzzi.

August 6, No. 94, pp. 985-992

69 *Fats in the Sputum. (Ricerche microchimiche sulle sostanze grasse dell'espettorato in condizioni normali e nella tubercolosi pulmonare.) N. Barbaro.

69. **Fatty Substances in the Sputum.**—Barbaro found a decided increase above the normal proportion of the fatty substances and lipoids in the sputum with pulmonary tuberculosis. The increase was greater the more advanced the tuberculous process.

Policlinico, Rome

August 2, XXI, No. 31, pp. 1109-1144

70 *Vaccine Therapy of Typhoid. H. V. Pensuti.

70. **Vaccine Therapy of Typhoid.**—Pensuti states that relapses occurred in 25 per cent. of thirty-seven cases of typhoid in which antityphoid vaccine had been applied in treatment. He theorizes to explain this enhanced tendency to relapse, and reports a series of thirty-one new cases in which the vaccine was given by another technic, based on the theory he advances. He injected the usual therapeutic dose and then continued with minute doses, keeping this up even for a few days after the temperature had returned to normal. The injections even of the minute doses were followed each by a brief rise, demonstrating the instability of the defensive forces, but they evidently reenforced them as recovery proceeded smoothly and there were no relapses in the entire series.

Brazil-Medico, Rio de Janeiro

July 15, XXVIII, No. 27, pp. 259-266

71 Operations on the Lacrimal Duct. (Operaçao de Toti e operaçao de West. E. Campos. Commenced in No. 26.

July 22, No. 28, pp. 269-278

72 Colitis Due to Chilomastix Mesnili; Five Cases. A. M. da Cunha and M. Torres.
73 *Isolated Right Ophthalmoplegia of Malarial Origin. (Caso de nevrite do motor-ocular commum e do pathetico de origem palustre.) A. Britto.

August 1, No. 29, pp. 279-286

74 *Atypical Rabies. (Caso atypico de raiva humana.) J. Miciel and U. Paranhos.

August 8, No. 30, pp. 287-296

75 *Case of Gynecomastia. C. Werneck.

73. **Neuritis of Malarial Origin.**—Britto's patient was a young man with paralysis of the nerves innervating the muscles of the right eye. There was a history of mild venereal disease but the blood contained the malaria germ and under quinin the ophthalmoplegia promptly subsided. Without microscopic examination of the blood the true cause of the trouble would scarcely have been suspected.

74. **Atypical Rabies.**—In the case reported a man of 60 developed symptoms which suggested rabies at first but they soon subsided and he seemed calm and cheerful and took baths and his meals normally, and the diagnosis was changed to incipient general paralysis. The fifth day the patient was found depressed and apathetic, with paralysis of the legs, and he died in a few hours. The necropsy findings proved the case to have been true rabies beyond question, but the man had never been bitten by any animal. He had told, however, that a few months before he had hurt his leg slightly and an old dog of his had licked the small sore and the dog had disappeared not long afterward.

75. **Case of Gynecomastia.**—Werneck says that in the case illustrated, the abnormal development of the mammary glands in a mentally backward young man was evidently secondary to atrophy of the testicles and cryptorchidism. The low blood-pressure and readiness to fatigue indicate insufficiency of the adrenals.

Nederlandsch Tijdschrift voor Geneeskunde, Amsterdam

May 30, LVIII, No. 22, pp. 1845-2044

76 *Arguments Why the Practice of Medicine Should be Restricted to Those Trained in Medical Science. (Artzenmonopolie en Geneesvrijheid.) C. A. Pekelharing, H. Treub and Others.

76. **Arguments for Safeguarding the Practice of Medicine.**—A movement is on foot in the Netherlands the aim of which is to throw down all the barriers that now protect the sick against ignorance and unscrupulous exploitation. The 200 pages of this issue of the *Tijdschrift* are devoted entirely to a survey of the value and necessity of the present safeguards, twenty-six leading physicians considering the subject from different standpoints, the whole forming an able protest against any letting down of the bars. B. J. Polenaar, a lawyer, tells of the numerous and far-reaching changes that would have to be made in the present laws to protect the public health and the sick in case the practice of medicine were to be thrown open to all. J. Slingenberg reviews the legislation in various countries in turn which regulate the practice of medicine; Germany and England, he says, are the only civilized countries which do not require a medical degree, and in Prussia alone the number of the untrained dealing in the healing art has risen from 2,404 in 1898 to 6,137 in 1905. C. A. Pekelharing traces the history of medicine from ancient days to the present, showing how superstition and mysticism have always hampered the progress of medical science and how strict science alone can be the basis for suitable treatment. C. Winkler shows that the

history of medicine seems to be a chain of errors and yet how at every point there is evidence that relative truth has emerged from the errors. Empiricism leads the way and scientific medicine follows. H. Treub, in an extremely interesting analysis of the differences between the charlatan and the trained physician, compares the untrained practitioner of medicine to a blind man stumbling around in a dark room seeking something he does not know what; while the scientific physician is like a normal man in a well lighted room seeking an object with which he is familiar.

The standing of physicians and the practice of medicine in ancient Greece and Rome and in the middle ages are discussed by K. Kuiper, J. W. Beck and M. A. van Andel. The charlatan as portrayed on the stage in the Netherlands and in Dutch literature is described by J. te Winkel while G. van Rijnberk tells of the quack in Dutch art, reproducing several engravings; he discusses further modern "miracle cures," hypnotism and magnetism. P. Muntendam depicts the harm done by books for home doctoring, written in a popular style, of which Germany has so many. He remarks that even those written by physicians have their disadvantages, but it is difficult to overestimate the harm done by the books of a Bilz, a Kuhne or other quacks.

The methods of various quacks and cults are described in a number of articles, H. U. Meyboom writing of Christian Science and the Emmanuel Movement, J. Stärcke of Amsterdam telling of the absurd and dangerous practices of many exponents of the drugless school. Household and folklore remedies are discussed by E. C. van Leersum and P. van der Wielen. Homeopathy and its erroneous conception of the action of drugs are discussed by H. Pinkhof of Amsterdam, and the dangers which would confront the public if the practice of medicine was not safeguarded are described by several writers. The way in which infectious diseases would spread and cancer progress unchecked if the movement for throwing open the practice of medicine to the untrained should succeed, are well shown by H. G. Ringeling and S. Mendes da Costa of Amsterdam. The latter emphasizes this in particular for venereal diseases and J. Rotgans for cancer. The harm that would be done to the public health, to social medicine and to social hygiene by removing restrictions to the practice of medicine is shown well by J. G. Sleeswijk, professor of hygiene at the University of Delft. The waste of money from quack practices is reviewed by E. J. Abrahams, who remarks that it is impossible to estimate the sums squandered for worthless or sometimes dangerous quack remedies, but he knows that quacks pay annually at least 800,000 florins for their advertisements in the papers and periodicals of the Netherlands. W. Nolen of Leyden reviews some of the latest achievements of medicine and comments on some of the disappointments it has encountered in recent years, and suggests new lines for further conquests. H. Schreve, medical director of the Rotterdam public hospital, concludes the series with instances of serious injury from the procedures of the naturopaths.

The issue closes with a book-review department, reviewing a number of new German and Holland works bearing on quackery and its menace to public health. The pamphlets issued by the leaders of a similar agitation in Germany are also analyzed and answered point by point.

Mitteilungen a. d. kais. Universität, Tokyo

April, XI, No. 3, pp. 309-494, German Edition. Last indexed May 30, 1914, p. 1765

77 Localization of Function in the Spinal Cord for Muscles of Hand, Leg and Diaphragm. J. Shimazono.
78 *Pathologic-Histologic Findings in the Nervous System with Beriberi. K. Honda.
79 Subacute Macrolymphocyte Leukemia; Only Transient Improvement Under Roentgen Treatment. S. Okada.
80 Embryologic-Anatomic Study of the Stria Vascularis of the Cochlea. (Stria Vascularis der Gehörschnecke.) T. Wada.
81 Congested Veins in the Back, etc., with Impeded Circulation in Inferior Vena Cava. S. Nukada.

78. The Changes in the Nervous System with Beriberi.—Honda gives some colored plates of the pathologic-histologic findings in a number of cases of beriberi emphasizing the characteristic and constant changes as they occur in both the central and the peripheral nervous systems. The pathologic findings are less pronounced in the peripheral nerves with acute than with chronic beriberi, but the extent of the nerves involved as a whole is greater than with the chronic form. He defines the acute form as that in which the nerves of more vital importance, the phrenic and vagus nerves and the nerves of the extremities are affected early and with great intensity. In the chronic cases the less vitally important nerves are affected early and intensely but those of great vital importance escape entirely or nearly entirely. In two infants with beriberi the changes in the nerves corresponded more to those of the acute form in adults although the clinical picture was more like that of the adult chronic type. Honda applies the Bielschowsky technic to specimens embedded in celloidin, and thinks that this modification of the otherwise ideal Bielschowsky technic is a great improvement. The specimen is not loose and can thus be easily handled; different stains can be applied to the same specimen, and mechanical injury in cutting frozen sections is done away with. He discusses the history of work on the nerves in beriberi and reviews the literature, tabulating the details of the histologic findings in his twenty-six cases.

Russky Vrach, St. Petersburg

April 12, XIII, No. 15, pp. 525-560

82 *Indications and Technic for Operative Treatment of Uterine Cancer. N. M. Kakushkin.
83 *Injury of Vagus in Operations on the Neck. T. K. Weber.
84 *Potassium Iodid Test for Differentiation of Cancer and in Treatment. M. P. Mikhailoff.
85 *Bacillus of Fish Poisoning. (Jac. ichthyismi.) S. V. Konstansoff.

April 19, No. 16, pp. 561-596

86 *Total Laryngectomy for Cancer. W. M. Mintz.
87 Gumma in Trachea Revealed by Tracheoscopy; Recovery Under Specific Treatment Plus Stretching the Stenosis. A. M. Nikolsky.
88 Paroxysmal Tachycardia. V. P. Simonovitch. Commenced in No. 15.

April 26, No. 17, pp. 597-632

89 Fat Embolism during Orthopedic Operations. G. I. Turner.
90 *Muscle Sign of Chronic Appendicitis. N. M. Volkovitch.
91 Influence of Bile Salts in Blood on the Vascularization of Organs. E. A. Kartashevsky.
92 Technic for Making Artificial Eyes. R. A. Katz.
93 Technic for Staining Negri Bodies. S. P. Kotzevaloff.

82. Uterine Cancer.—This and some other articles in this issue were read at the first general meeting of the All-Russian Association for the Campaign against Cancer. Kakushkin thinks that both the abdominal and the vaginal routes have their indications. The latter is best for incipient cases and when the body of the uterus is involved. The abdominal method should be preferred when there is parametritis with adhesions, and then the transverse incision is desirable. He advises hysterectomy even for benign hyperplasia of the cervix and erosions in prophylaxis of cancer.

83. Dangers of Injuring the Vagus in Operations on Tumors in the Neck.—Weber reports five cases to show the serious dangers liable from reflex action when the vagus is injured in operations on the neck, and cites Reich's compilation of forty-four cases with five deaths. For these reasons he urges the importance of blocking the nerve with a 20 per cent. cocain solution, above and below the tumor, to ward off trouble if it should happen to be injured. One of Weber's five patients succumbed half an hour after the operation. The others recovered but one was left with paresis for a time.

84. Potassium Iodid in Diagnosis and Treatment of Cancer.—Mikhailoff strongly recommends potassium iodid in internal cancer, preferably in the form of rectal injections (4 gm. potassium iodid; 2 gm. sodium carbonate and 80 or 100 c.c. distilled water). This he supplements with 1 per cent. solution of sodium arsenate (sodium arsenici) hypodermically, which solution must be made with 0.25 per cent. phenol. He found that if the temperature rises one or two hours after the rectal injection of the potassium iodid, then we positively have to do with a malignant growth (carcinoma or sarcoma). If the temperature remains stationary or even declines, then cancer can be excluded and syphilis is probable. He sees in

the action of potassium iodid in this respect an analogy to the action of tuberculin in tuberculosis, and claims that carcinoma can be cured in certain stages of malignant disease with this method of treatment. It reveals the presence of cancer like the positive response to the tuberculin test in tuberculosis, and a systematic course of treatment with it has a curative influence like that of tuberculin.

He states that potassium iodid seems to display a special affinity for cancer cells in the test-tube, and his clinical experience apparently indicates that this is the case also in the human body. For the differential diagnosis, he gives the rectal injection as above described, and repeats it after an hour or hour and a half to a maximum of three injections, but one is generally sufficient. The temperature reaction becomes manifest in one or two hours. He does not give specific instances or figures, but relates that after his course of treatment with potassium iodid supplemented by subcutaneous injection of a 1 per cent. solution of sodium arsenate, some of the patients are still living who had been told years before by leading clinicians that they had internal and hence inaccessible cancer. All his patients thus treated were in this inoperable class, as he always operates for accessible cancer.

85. **Fish Poisoning.**—Konstansoff found the bacillus of fish poisoning in two kinds of fish. Very small doses of pure agar cultures killed white mice in from six to twelve hours. As this bacillus is very similar to the *Bacillus botulinus* of van Ermengem, Konstansoff thinks that it is probably a variety of the latter.

86. **Laryngectomy for Cancer.**—Mintz has removed the entire larynx on account of malignant disease in 29 cases, and tabulates here the details of each. Seven of his patients (24 per cent.) lived for more than a year, and 3 are in good health to date over seven, eight and twelve years since the operation. It is remarkable that the two patients who have survived the longest both required a second operation for recurrence in a gland four and twenty months after the primary laryngectomy. The ultimate outcome in a number of the other cases is not known later than a few months.

90. **Muscle Sign of Chronic Appendicitis.**—Volkovitch found that in chronic appendicitis, or in intervals between acute attacks, the abdomen is relaxed in the right iliac region contrary to what is usually observed in acute appendicitis. In addition the abdominal muscles on the right side seem to shrink and atrophy. The more pronounced this so-called muscle sign, the severer is the appendicular lesion. This sign is absent with inguinal hernia, but Volkovitch is unable so far to tell if it is positive in other lesions of the right abdominal cavity, such as pelvic lesions in females, gallstones, etc. The relaxed condition of the abdominal muscles in chronic appendicitis may lead to scoliosis on the left side, and he asserts that left-sided scoliosis should raise suspicions of a possible chronic appendicitis.

St. Petersburger medizinische Zeitschrift

July 15, XXXIX, No. 14, pp. 169-184

94 Dangers of Transmission of Disease by Head Louse. (Pediculosis capitis.) A. Spindler.

Hospitalstidende, Copenhagen

July 28, LVII, No. 30, pp. 921-952

95 *Cysts in the Pancreas. J. Ipsen. Commenced in No. 29.

96 *Lye Injury of Esophagus. (Tilfaelde af alvorlig osophagusaetsning.) P. Zachariae.

August 12, No. 32, pp. 985-1016

97 *Rupture of the Mesentery. K. Sand.

August 19, No. 33, pp. 1017-1048

98 Unilateral Multiple Chondromatosis in Girl of 6. (Ollier's vaextforstyrrelse.) A. Bojesen. Concluded in No. 34.

99 Conflicting Tendencies in the Psychiatry of the Day. (Stridende strømninger i tidens sindssygelære.) Dedichen. Commenced in No. 32.

95. **Cysts in the Pancreas.**—In one of Ipsen's six cases a trauma seems to have been responsible for the development of the cysts. The first symptoms of trouble were apparent two days later. When the pancreas is injured in an accident, acute inflammation follows if the trauma was severe and much pancreatic juice was forced out, while there may be merely production of a cyst if the injury was comparatively slight. In another of his cases the cyst was probably secondary to the cancer found with it, the cancer having injured the tissues like a trauma. The four other patients had long had recurring attacks of pain, and gall-stones were found at necropsy in two cases. These were probably the cause of the attacks of pain, and the passage of a stone may finally have stretched the opening leading up into the pancreas with resulting destruction of pancreas tissue and cyst production.

In the other cases the attacks of pain and occasionally transient jaundice retrospectively suggest gall-stones, but no search was made for them at the operation on the pancreas. The pains, however, were always localized on the left side. The smaller the cyst the more difficult the diagnosis. In one case the symptoms seemed to suggest perforation of a gastric ulcer or peritonitis but the signs of pleuritis and transient albuminuria did not agree with this, and Roentgen-ray examination revealed an accumulation of fluid just below the left diaphragm. Treatment can be only surgical, suturing the lips of the cyst to the skin with care not to let the contents of the cyst come in contact with the skin. There is no well-defined lining of the cyst in the class of cases here described, in which digestion of tissue is responsible for the cyst production. Any attempt to cut out the cyst merely leads to more destruction and may entail hemorrhage except when the cyst is found circumscribed and lined with epithelium or is merely a small corrosion cyst in the head of the pancreas.

96. **Corrosion of Esophagus from Lye.**—The child of 2 drank a swallow of lye and the stomach was rinsed out at once. A few days later the lining of the esophagus was thrown up in the form of a nearly perfect tube 14 cm. long. The esophagus was systematically dilated with a catheter passed down into the stomach once a day for about nine months and then at longer intervals, and the child seems to have no further signs of trouble. The catheter was introduced for the first time twelve days after the lye had been swallowed, seven days after the lining of the esophagus had been cast off. The text-books warn not to begin catheterizing until after there is no more blood or pus in the mucus cast up, that is, not for three to six weeks, but Zachariae's success in warding off stenosis in this case suggests that it is better to commence earlier. Rovsing found it impossible in one case to introduce even the finest sound one month after the caustic had been swallowed. It is also a question how long the dilatation must be kept up. Bloch advises it occasionally all through life, to ward off recurrence, and Zachariae has another patient who had return of trouble after 60 although the lye injury occurred during childhood. It is certainly a wise plan, he remarks, to let no month pass without introducing the catheter once, as prevention in these cases is so easy while it is so hard to cure inveterate stenosis.

97. **Rupture of the Mesentery.**—Sand says that there have been only five cases of this during the last ten years at the Copenhagen public hospital; Prutz has recently compiled forty-four cases. The mortality in the operative cases was 38 per cent. while all died in the cases in which no operation was attempted. The exact diagnosis is never possible before the abdomen is opened and then it is always a question whether the bowel should be resected or not. In case of doubt, it is safer to do the resection. He describes in detail a typical serious case successfully treated on these principles.

Norsk Magazin for Lægevidenskaben, Christiania

August, LXXV, No. 8, pp. 873-1000

100 Meningitis Secondary to Ear Disease. (Den otogene meningitis patologi, symptomer og diagnose.) V. Uchermann.

101 Juvenile Criminality and Neglected Childhood. (Er "den unge forbryder" en fortsættelse av "det forsømte barn"?) S. Dahlstrøm.

102 Sea-Weed Products in Balneology. (Den balneologiske anvendelse av norske tangprodukter.) J. R. Natvig.

103 Yellow Skin After Eating Raw Scraped Carrots: Two Cases. (To tilfælder av gullerotfarvning.) E. Møinichen.

104 Cystic Kidney: Two Cases. (To tilfælder av cyster i nyren.) N. Paus.